

# **Operating and Maintenance Manual**

**CF-6100, Line 1  
CHECKWEIGHER  
Serial no: 14861670  
Year of manufacture: 2020**

CARGILL ANIMAL NUTRITION  
(Roanoke, VA)

REVISION 0 (2020-07-15)  
Manual Number: 338980



## GENERAL WARNINGS

FAILURE TO COMPLY WITH THE RULES PUBLISHED IN THIS  
MANUAL MAY RESULT IN PHYSICAL INJURY OR MATERIAL  
DAMAGE

This document contains the most up-to-date information available at the time of publishing. Due to Premier Tech's ongoing improvement policy, the company reserves the right to discontinue or update manuals and technical information as it sees fit, without notice and without further obligation on its part.

---

### **WARNING**



**Only qualified personnel with a thorough knowledge of the equipment and its Operating and Maintenance Manual are authorized to handle, install, operate, adjust, troubleshoot and maintain the equipment.**

### **DANGER**



**Always perform the lockout procedure before making any equipment or part maintenance, repair, modification, replacement, assembly or disassembly; or taking any action involving even the slightest risk. The procedure must be performed by each person making any of the above-mentioned action.**

### **DANGER**



**Never use this equipment for purposes other than those for which it was intended.**

---

**DANGER**

Make sure no one is within the equipment perimeter before starting up. Watch equipment throughout the startup process.

**DANGER**

When the equipment is running, ensure not to come into contact with any part of the equipment.

**WARNING**

The operator must know the location and have a thorough knowledge of operating controls and safety devices before using the equipment.

**WARNING**

Before starting the equipment, ensure that all protective guards are in place and that the equipment is in good working order.

**WARNING**

Only qualified personnel are authorized to open electrical panels.

**WARNING**

Make oil changes only when the surface of the reducer is warm. Cold oil does not flow well and hot oil can cause burns.

**CAUTION**

Changing proximity and photoelectric sensors original position may result in operating problems or damage to equipment.

**CAUTION**

When the controller battery is low, a warning is displayed. In this case, it is imperative to avoid shutting off electrical power except when replacing the battery. If the electrical power is shut off more than thirty minutes, the PROGRAM WILL BE LOST.

**CAUTION**

Do not mix synthetic oils with other oil types or brands. This will cause oil to break down.

# TABLE OF CONTENTS

<b>GENERAL WARNINGS .....</b>	<b>II</b>
<b>TABLE OF CONTENTS .....</b>	<b>IV</b>
<b>WRITING CONVENTIONS .....</b>	<b>VI</b>
<b>1 SAFETY .....</b>	<b>7</b>
1.1 Unloading and Handling .....	8
1.2 General Rules .....	9
1.3 Operator Training .....	12
1.4 Safe Operation .....	12
1.5 Fire and Explosion Prevention .....	16
1.6 Safety Signs .....	17
<b>2 DESCRIPTION .....</b>	<b>21</b>
2.1 Modules .....	22
<b>3 OPERATION .....</b>	<b>24</b>
3.1 Operating Controls .....	25
3.2 Calibration .....	26
3.3 User Interface .....	26
<b>4 TROUBLESHOOTING .....</b>	<b>61</b>
4.1 Electrical Devices Check .....	62
4.2 Alarm Messages .....	63
4.3 Major System Error .....	66
4.4 Major System Warning .....	69
<b>5 MAINTENANCE .....</b>	<b>71</b>
5.1 Checkweigher Belt Tensioning Procedure .....	72
5.2 Battery Replacement Procedure .....	73
5.3 Introduction to the Maintenance Table .....	74
<b>6 APPENDICES .....</b>	<b>75</b>

Printing and Reporting .....	<b>76</b>
Fieldbus Communication .....	<b>90</b>
SpeedAC iQ Communication Protocol .....	<b>119</b>
SpeedAc iQ Bagging Communication Parameters .....	<b>120</b>
Input and Output Descriptions .....	<b>137</b>
1_Calibration Manual ADM_KAE _Februrary 2016 .....	<b>141</b>
2_Technical Manual_IT8000ET_THE 201702 Rev2 .....	<b>191</b>
3_Junction Box_THE 201602 .....	<b>297</b>
4_Relay_TRIO_IAE 201602 .....	<b>319</b>
5_Digital Analog Module_DAM_IAE 201703 .....	<b>347</b>
6_Analog IO Module_MAI_IAE 201604 .....	<b>351</b>

# WRITING CONVENTIONS

## TYPOGRAPHY

Each machine and equipment line is composed of a series of modules. Each module has a name and a number. Module names are set in **SMALL CAPITALS**.

Names of operating screens, controls, and parameters are set in **bold type**.

All hyperlinks to sections or chapters are in **blue**.

## ITEM NUMBERING

Most components of equipment (motors, sensors, valves, etc.) are labeled with a code. The first two or three digits refer to the module number. The middle letters describe the item. The last digit is required to increment the code if necessary.

Example: 180-M1 is motor #1 on module 180.

## SAFETY NOTICES, TIPS AND NOTES

### DANGER



Where this message appears failure to comply with procedures and safety recommendations will result in death or serious injury.

### WARNING



Where this message appears failure to comply with procedures and safety recommendations could result in death or serious injury.

### CAUTION



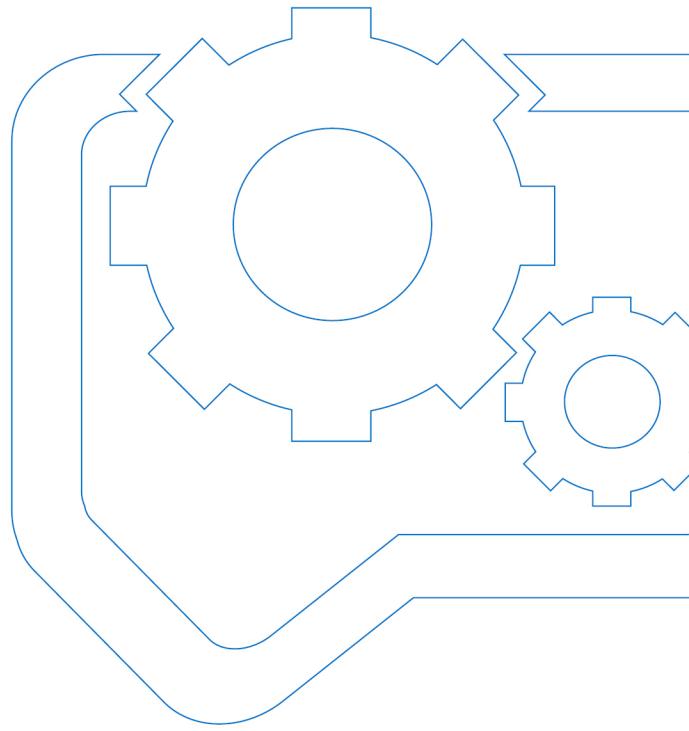
Where this message appears failure to comply with procedures and safety recommendations may result in equipment damage.



Tip providing advice on use or additional information. These are particularly useful for first-time users.



Note warning about the irreversibility of an action or about situations that require special attention.



# 1 Safety

1.1 Unloading and Handling .....	8
1.2 General Rules .....	9
1.3 Operator Training .....	12
1.4 Safe Operation .....	12
1.5 Fire and Explosion Prevention .....	16
1.6 Safety Signs .....	17

This chapter describes the entire body of safe practices for all items of equipment commercialized by Premier Tech. Therefore, some safe practices may not apply to all items of equipment. The user has to take into consideration only the rules applying to the relevant items of equipment.

Each equipment user is responsible for understanding and complying with applicable local, provincial and federal laws and regulations, including those regarding safety.

To assist its customers in this area, however, Premier Tech issues the following basic safe practices. The user will no doubt be required to draft more detailed rules so as to comply with local regulations and accommodate specific operating conditions.

In addition to complying with the abovementioned provisions, measures and safe practices, the equipment user must refer to and comply with any applicable safety instructions issued by manufacturers of all related modules and all components of the equipment used.

As specified by applicable safety standards, the user has the responsibility to ensure that their company's personnel are properly trained, that this manual is handed over or made available to said personnel and that their company's personnel have read, understood and complied with all instructions, especially regarding safety.

Applicable safety standards also require the user to complete a risk assessment and ensure that the risk level is maintained at an acceptable level during handling, installation, operation, adjustment, troubleshooting and maintenance of equipment. Should the user want to further reduce the risk level through equipment design, Premier Tech may offer additional safety devices, mainly for risks associated with possible equipment misuse.

## 1.1 Unloading and Handling

Certified handling, hoisting and support techniques must be used when moving or lifting the equipment and component parts. The equipment is heavy and can cause severe injury or death if it falls.

Do not use lifting hooks to lift or move a group of modules or the whole equipment. Lifting hooks are designed to lift individual modules only.

Do not walk or stand under or near a load suspended by hoisting equipment such as crane, forklift, bridge crane, loader, hydraulic or compressed-air piston, or inclined unloading ramp. The equipment is heavy and can cause severe injury or death if it falls. Where this situation cannot be avoided, ensure that the load is restrained by blocks, posts, stays or beams, for example.

If there is any chance that a load's center of gravity may shift in relation to the device used to hoist or restrain it, secure the load firmly to the hoisting device before hoisting.

Do not stand under a load supported by wheels unless the wheels are blocked to prevent horizontal movement.

Make sure to anchor electrical panels and all parts of equipment. Non anchored parts could fall and cause serious injuries or death.

## 1.2 General Rules

**WARNING**

Some equipment can start up automatically. Never enter a danger zone without performing the lockout procedure.

**DANGER**

Never touch or enter the path of moving components without performing the lockout procedure. Doing so may result in serious injury or death.

**DANGER**

Never open an electrical panel with power on. Only qualified personnel wearing appropriate personal protective equipment are allowed to work on an electrical panel with power on. Arc flash and electrical shock hazard.

**DANGER**

Never access equipment interiors using areas intended for loading or discharging product, empty bags, filled bags, containers, empty pallets or pallet loads. Only use areas specifically intended for accessing the equipment.

**WARNING**

Areas specifically intended for accessing the equipment allow safe access to this equipment section only. Never try accessing nearby equipment sections without using their own designated access areas.

**WARNING**

Never walk on a conveyor. Always use the designated access and circulation areas.

**CLOTHING, JEWELRY AND LONG HAIR**

Although equipment is fitted with guards to protect operators from moving components, these devices do not always provide complete protection. It is the operator's responsibility to

show caution and good sense. The following points are basic safety precautions, and should always be obeyed.

- Never wear loose clothing (shirt, sweater, tie, scarf, etc.) that could get caught in the machine.
- Never wear jewelry, except for a medical alert bracelet or necklace.
- Long hair must be confined in a net or otherwise securely confined.

#### PERSONAL PROTECTIVE EQUIPMENT

When working on or around equipment, workers must always wear the following personal safety items: safety glasses, safety helmet, and safety boots. Respirator masks must be worn when working in areas where the air's pollutant or dust content exceeds permissible limits. Hearing protectors (plugs, ear muffs or other) must be worn in work areas where the noise level exceeds permissible limits. A safety harness must also be worn when accessing an elevated, unprotected section of the machine. Anchorage connectors are installed on equipment where height accesses are predictable. When anchorage connectors are present, use them as well as safety harnesses.

Also, long-sleeved overalls, safety helmet, visor and safety boots must be worn at all times when working near a piece of equipment that features a hydraulic unit.

Gloves must be worn at all times when working near a piece of equipment that features a hydraulic unit. Also wear gloves to touch surfaces or tools that have become warm, but do not touch hot surfaces or tools that have become hot (more than 60°C/140°F).

#### LABELING OF CONTROLS AND WARNINGS

Plaques affixed to the equipment are used to label equipment controls, including emergency-stop controls, and provide specific warnings and instructions for safe, efficient use of the equipment. These plaques must remain in place and must be visible at all times.

All workers who operate the equipment must have a perfect knowledge of the location and function of all controls and must be familiar with the meaning of warnings and instructions.

#### TRAVEL AROUND EQUIPMENT

Use the appropriate entrance areas when going within the equipment's perimeter. Never approach the equipment unnecessarily.

Use catwalks to cross conveyors. Never step on or over a conveyor.

Never access a high, unprotected zone without a safety harness. Anchorage connectors are installed on equipment where height accesses are predictable. When anchorage connectors

are present, use them as well as safety harnesses. If a part is hard to reach, use a maintenance platform or other safety equipment instead.

Never run in the workplace.

No one should enter or loiter in a bulk material storage area (bunker) or any other area located under a discharging point. Product or objects may fall and cause severe injuries. Furthermore, care should be taken when walking under or next to conveying equipment. Use the specifically designated areas to move around and under these pieces of equipment.

#### ELECTRICAL CABINET

Never open an electrical panel with power ON: there is an arc flash and electrical shock hazard. When work must be performed on an electrical panel with power ON, a safety perimeter must be set in front of the electrical cabinet. Only qualified personnel wearing appropriate personal protective equipment are allowed to work inside the safety perimeter.

#### CLEANLINESS AND GOOD ORDER

A clean, tidy work area helps reduce the risk of accidents. Each operator is responsible for keeping the work area in good order at all times.

Access to exit doors and electrical panels must remain unobstructed at all times.

Water, oil or another liquid can make a floor slippery and lead to falls, causing serious injuries. Always have the appropriate absorbent materials and tools on hand to keep the floor dry and safe.

#### ERGONOMICS

To lift a load of more than 50 lb (25 kg), use a lifting device or ask for help.

#### COMPRESSED AIR

Incorrect handling of compressed air is dangerous and may result in serious injury, explosions or even death.

Using compressed air may create a combustible dust cloud conducive to explosions. It is therefore highly recommended to clean and remove the dust using suction vacuum (vacuum cleaner, dedusting system, etc.) instead of compressed air.

#### HAZARDOUS PRODUCT HANDLING

When Premier Tech equipment is to be used for handling potentially harmful materials, always refer to the Material Safety Data Sheet (MSDS) provided by the product supplier and follow the handling, storage and disposal safety recommendations.

## 1.3 Operator Training

Safe and effective use of equipment requires an operator who has been specifically trained for the task.

Operator training must include a detailed review of the Operating and Maintenance Manual. The operator must have access to this manual at all times. Special attention must be given to the location and operation of all controls and safety devices, including emergency-stop controls and protective guards. A thorough knowledge of the safe practices in the Operating and Maintenance Manual is indispensable.

Ensure that the operator is fully trained on the equipment prior to being allowed to operate it.

## 1.4 Safe Operation

The operator must follow all Operating and Maintenance Manual procedures.

**WARNING**

**It is strictly forbidden to remove or disable protective guards or other safety devices, except where necessary for adjustment or maintenance purposes.**

**DANGER**

**Make sure no one is within the equipment perimeter before starting up. Watch equipment throughout the startup process.**

**DANGER**

**Make sure no one is inside the equipment before closing a safety door, resetting a safety light curtain, an emergency-stop button or any other safety devices and restarting the equipment.**

Before using the equipment, locate all safety devices and operating controls. Make sure you understand how they work and how to use them. Never take a risk that could cause an injury.

Only use this equipment for the purpose it was designed for.

While operating equipment, the operator may encounter situations not covered in this manual. If this is the case, or if a procedure appears dangerous, the operator must shut down the equipment and immediately advise his supervisor.

If modifications are necessary, both the operator and supervisor must make sure that they understand the consequences of the steps to be taken, ensuring that they will not cause any injury. Think first, stay alert, and exercise caution.

**RISK OF CONTACT WITH MOVING COMPONENTS**

It is strictly forbidden to touch or enter the path of moving components, or components that are likely to start moving, such as conveyors, robots, connecting rods, mobile mechanical components, etc. The lockout procedure must have been performed before any intervention on components which are not immobilized by the activated safety system.

It is also forbidden to climb on equipment or to use a stool, stepladder or ladder to reach an elevated part of equipment when it is in operation.

**SAFETY DEVICES**

It is strictly forbidden to remove or disable protective guards or other safety devices, except where necessary for adjustment or maintenance purposes. Such activities must be performed on a locked equipment and by authorized personnel who will ensure that alternative safety measures are taken and all safety devices are replaced and are functional immediately after these procedures are completed.

Never use equipment if a protective guard, an emergency-stop control or any other safety device is missing. Any operator who notices such a situation must advise his supervisor, who will make sure the machine remains inoperative until the problem is corrected (see [Lockout procedure](#)).

Furthermore, if equipment comes with an interlock key, never take the key from a safety door lock to start the machine. Always use the same interlock key to execute the following sequence of operations: unlock a safety door, lock it again and restart the equipment. Using a duplicate key would bypass this safety system.

Should a secondary safety key released by the access system be included, it must be carried by the person as long as he/she is inside equipment.

In order to keep all door safety mechanisms in good working order, avoid banging the safety doors. To prevent damage, handle all safety mechanisms with care.

Only use an emergency-stop control to stop equipment if there is a risk of worker injury or if equipment must be stopped immediately.

At the beginning of every shift, the emergency-stop circuit and all safety devices must be checked to make sure they are working properly. Refer to the [Operation](#) chapter for instructions on testing the emergency-stop circuit. Refer to the electrical diagrams to identify the safety devices.

**VISUAL INSPECTION OF EQUIPMENT**

The operator must always inspect equipment before startup to ensure it is in good working order. If capable, the operator must correct any breakage, blockage, leak or abnormal

condition. Otherwise, he must advise his supervisor so the issue can be solved before starting up.

Equipment that is in operation must be stopped immediately if a breakage, blockage, leakage or abnormal condition is noticed. The operator must correct the problem if possible. If he cannot, he must advise his supervisor.

#### RISK OF A SHIFTING OR FALLING LOAD

Moving heavy loads can be necessary during operation of equipment, such as loading a new film roll. See the risks and safety measures at Section [1.1](#).

#### LOCKOUT PROCEDURE

The lockout procedure is used to prevent accidental injury or death when equipment is inadvertently started up while workers are adjusting, maintaining it or performing any other intervention involving the slightest risk. The lockout procedure also prevents the startup of defective equipment or equipment in need of repair.

##### DANGER

 Always perform the lockout procedure before making any equipment or part maintenance, repair, modification, replacement, assembly or disassembly; or taking any action involving even the slightest risk. The procedure must be performed by each person making any of the above-mentioned action.

#### To lockout equipment

1. Advise the equipment operator(s) that a lockout is going to be performed.
2. Identify the machine power source(s):
  - Electrical
  - Compressed air (including tank)
  - Combustion engine
  - Hydraulic (including accumulator)
  - Gravity (including pendulum)
  - Springs
3. Shut off all possible sources of electrical power to the equipment by turning off and locking out all disconnect switches. Tag all locks according to your company's safety rules.
4. Keep the key(s) with you throughout the entire work process. Never entrust the keys to anyone else or leave them anywhere.

5. Shut off and lock out any pneumatic supply lines.
6. Release any residual energy in the equipment where applicable (compressed air, springs, hydraulic energy, gravity, etc.).
7. To make sure the equipment lockout is effective, attempt to start the machine. No machine movement should occur.

### To unlock equipment

1. Advise the equipment operator(s) that power is about to be restored.
2. Make sure the equipment is back to its normal operating condition, with all protective guards and safety devices in place.
3. Perform a visual inspection to ensure that no one can be injured when power is restored.
4. Remove your lock and tag.
5. Put power back ON.

**WARNING**

Always stand on the side of the panel when turning the main disconnect switch or pushing the main disconnect handle to ON.

### EQUIPMENT SHUTDOWN

For an extended stop period, Premier Tech recommends turning the main disconnect switch to off in order to prevent equipment damages.

### ELECTRICAL COMPONENTS

**DANGER**

Every housing containing electrical components must remain closed. If a temporary access to the housing is required, equipment must first be locked out.

Only qualified personnel, i.e. certified electricians, should be authorized to access the equipment.

### CONFINED SPACES

Access to confined spaces for maintenance, troubleshooting or any other purpose must be done exclusively by authorized qualified personnel. Any access in such confined spaces must be preceded by the lockout procedure and must be compliant with all applicable local, provincial and national rules.

## 1.5 Fire and Explosion Prevention

Flammable, explosive or combustible products represent a risk of fire or explosion. The following safety measures must be taken when Premier Tech equipment may be in contact with products that are flammable, explosive or which generate combustible dust (for example highly powdery products such as flour, sugar, etc.).

**DANGER**

**Combustible dust accumulation can create a fire or an explosion. Clean daily.**

**INSPECTION**

- Make sure that all pieces of equipment upstream from Premier Tech equipment cannot generate a source of ignition (spark, heat, electrical arc, fireball, etc.).
- Keep open flames or heat source away of Premier Tech equipment.
- Permit and training is required for hot work and electric work near Premier Tech equipment. Clean equipment before work.
- Make sure that all components which can generate an ignition source (bearings, electrical components, chains, valves, actuators, feeding screw, etc.) are in good working order and properly adjusted before starting equipment.
- Make sure all seals are working properly.
- Regularly inspect grounding/bonding with ohmmeter. Reading should be less than 100 ohms and ideally, less than 10 ohms.
- Check that all bonding of the mechanical structure are installed and functional before operating equipment.
- Make sure the bonded equipment is properly grounded. Equipment's ground must be connected to the ground of the customer's building. The ground of the electrical cabinet must be connected to the customer's electrical system. Regularly validate the presence and condition of ground wires.
- Shut off power to any damaged electrical circuit in which bare conductor wires are exposed. Repair the damage promptly to prevent sparks or fire.
- Never operate equipment if cables are damaged.
- Corded portable power tools must have a ground wire connected and must be in good working order at all times.

## OPERATIONS

- Smoking is strictly prohibited around and near Premier Tech equipment.
- A working extinguisher of the appropriate class must always be within reach of the operator. It is highly advisable that you consult your local Fire Department to determine which norms apply to your equipment.
- Make sure all electrical cabinets and boxes are closed during operation of equipment.
- Avoid hot work in the presence of products that are flammable and/or explosive and/or which generates combustible dust.
- Never bring a heat source within 11 meters of the equipment, or near any products that are flammable and/or explosive and/or which generates combustible dust.
- Use antistatic bags to avoid sparks due to static electricity.
- If a dust collection unit is supplied with the equipment, ensure that it is functional at all times and that the flow/pressure requirements are met. Never operate the equipment if dust cannot be collected by the dust collecting system.

## MAINTENANCE

- Clean any accumulation of product on equipment and its environment (including electrical cabinets and boxes), as well as surrounding equipment, daily.
- If a dust accumulation of more than 3 mm (1/8 in) is predictable during the operating period, a daily cleaning is insufficient. Stop equipment and clean before restarting.
- Any damaged or malfunctioning part must be replaced with a component having the same specifications and certifications as the original one.
- On a weekly basis, check the good working of mechanical components that can cause sparks and overheat due to mechanical friction (butterfly valves, cylinders, bearings, etc.).

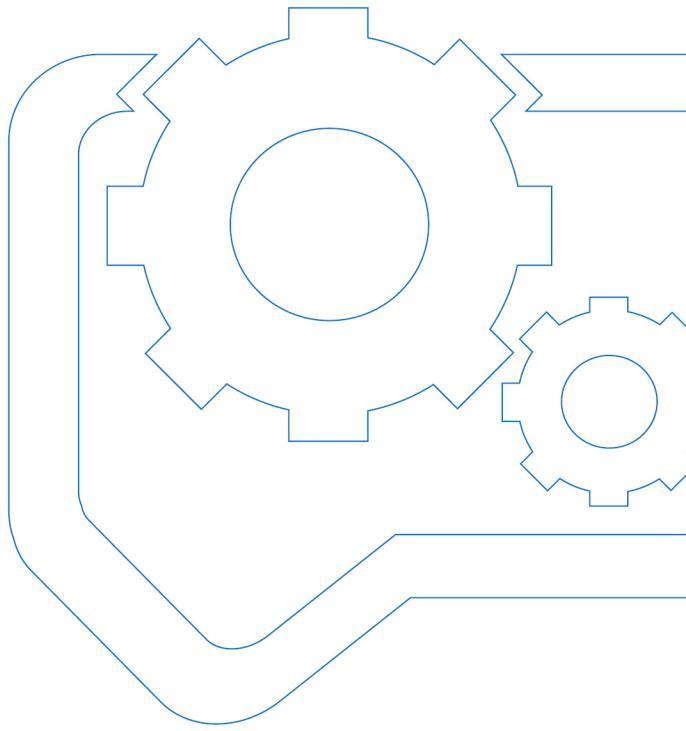
## 1.6 Safety Signs

This section explains the meaning of the various safety signs affixed to Premier Tech equipment.

 <p><b>MANDATORY ACTION</b> Read and understand the Operating and Maintenance Manual before using this equipment.</p>	 <p><b>MANDATORY ACTION</b> Lockout point. Shut off and lock out this power source during the lockout procedure.</p>
 <p><b>MANDATORY ACTION</b> Wear Safety Harness.</p>	 <p><b>MANDATORY ACTION</b> Wear face protection, ear protection, safety overalls and safety helmet.</p>
 <p><b>MANDATORY ACTION</b> Grounding or bounding point. Link this point to the ground.</p>	 <p><b>LIFT POINT</b> Use this point to attach lifting equipment.</p>
 <p><b>DO NOT ENTER</b> Authorized personnel only.</p>	 <p><b>STAY CLEAR</b> Access limited to authorized personnel only.</p>
 <p><b>KEEP OUT</b> Danger zone.</p>	 <p><b>DO NOT STEP</b> No stepping or standing on surface.</p>
 <p><b>DO NOT REACH INTO</b> Danger zone inside.</p>	 <p>Only operate when all protective guards are in place.</p>
 <p><b>BE ALERT</b> Emergency-stop button nearby</p>	 <p>Never place hands, arms or other body parts near the zone identified by the black and yellow strips.</p>
 <p>Equipment starts automatically.</p>	 <p><b>DO NOT TOUCH</b> Arc flash and electrical shock hazard. Appropriate personal protective equipment required.</p>

	KEEP CLEAR Moving parts can crush.		KEEP CLEAR Moving parts can crush.
	KEEP CLEAR Moving parts can crush.		KEEP CLEAR Moving parts can crush.
	KEEP CLEAR Moving parts can crush and cut.		KEEP CLEAR Moving parts can crush and cut.
	KEEP CLEAR Moving parts can crush and cut.		PINCH POINT HAZARD Keep clear of chain drive.
	PINCH POINT HAZARD Keep clear of belt drive.		PINCH POINT HAZARD Keep clear of belt drive.
	PINCH POINT HAZARD Keep clear of rollers.		PINCH POINT HAZARD Keep clear of rollers.
	PINCH POINT HAZARD Moving parts can crush or cut.		PINCH POINT HAZARD Moving parts can crush or cut.
	PINCH POINT HAZARD Moving parts can crush or cut.		PINCH POINT HAZARD Auger can crush or cut.
	BURN HAZARD Hot surface. Do not touch.		FALL HAZARD Stay clear of auger area.

 <p><b>FALL HAZARD</b> Do not walk on a conveyor in operation.</p>	 <p><b>ENTANGLEMENT HAZARD</b> Stand clear of transfer area.</p>
 <p><b>RISK OF FALLING OBJECTS</b> Do not walk or stand near an area where there is a risk of falling units (bags, boxes, etc.) or product.</p>	 <p><b>LOW CLEARANCE</b> Wear a safety helmet in this area.</p>
 <p><b>RISK OF FLYING DEBRIS</b> Wear safety glasses.</p>	 <p><b>LASER RADIATION</b> Avoid eye exposure to beam.</p>
 <p>Pressurized bottle.</p>	



## 2 Description

2.1 Modules ..... **22**

The CF-6100 Series checkweigher is an accurate bag weighing system that can accommodate different bag sizes and weights at low or high speed. This self-contained unit allows instantaneous weight reading and statistical data collection. When linked to a bag rejection device, it can indicate bags to be rejected.

The CF-6100 Series checkweigher is a conveyor mounted on four load cells. It is driven by a gear motor which is not controlled by its own control panel; but by an other equipment part of the same production line. However, motor specifications are listed in the CF-6100 Parts and Drawings Manual. The checkweigher can be equipped with tower lights and remote display. An anti-corrosion version is also available.

The checkweigher is controlled by the SpeedAC iQ weighing controller. The SpeedAc iQ a user-friendly weight controller allowing complete control of the check weighing process with unprecedented efficiency. Operation is carried out via a large graphic display that provides performance feedback, fine-tuning functions, statistical data, information on the system status and more.

## 2.1 Modules

This section lists all standard and optional modules of the machine and identifies their location. Refer to the *Parts and Drawings Manual* to get detailed drawings of each module.

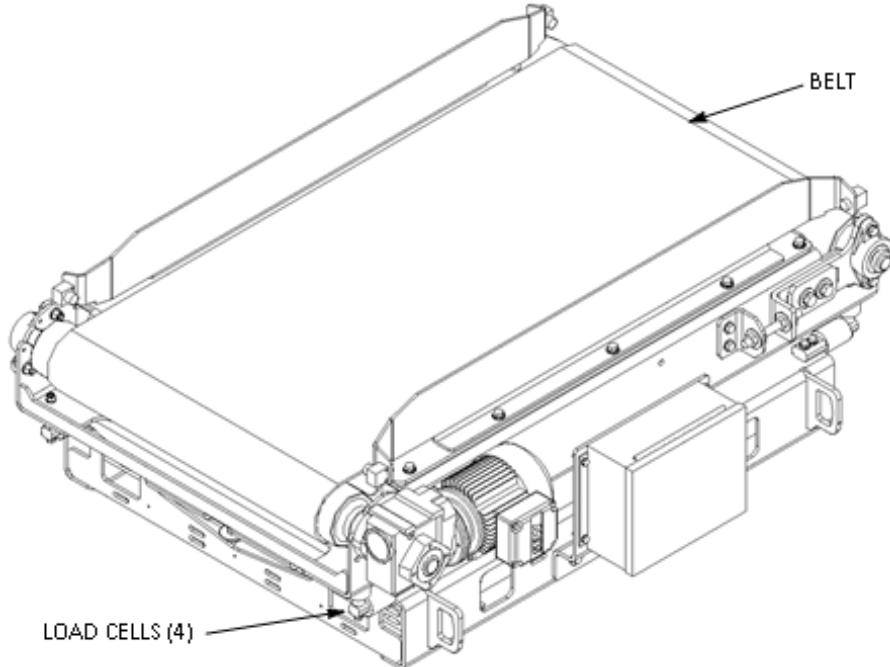
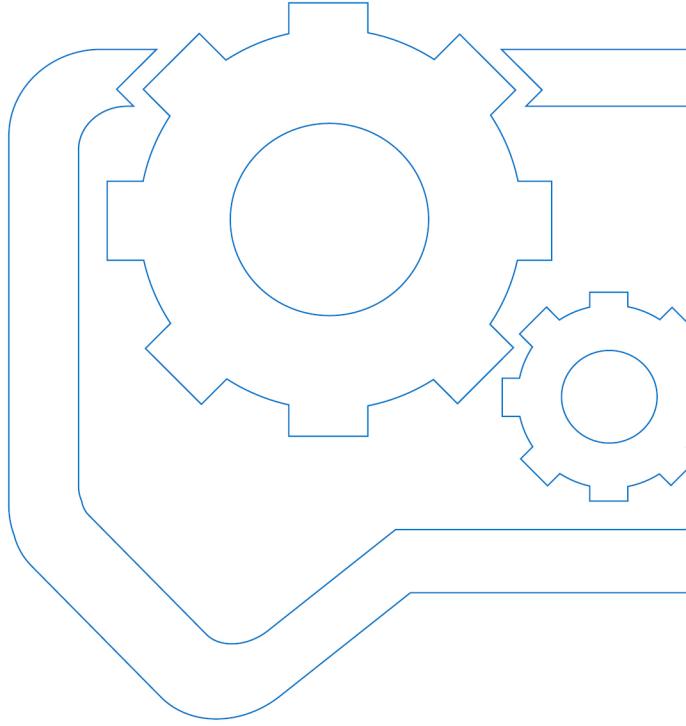


Figure 2-1 Modules of a checkweigher

**CAUTION**

Changing proximity and photoelectric sensors original position may result in operating problems or damage to equipment.



# 3 Operation

3.1 Operating Controls .....	25
3.2 Calibration .....	26
3.3 User Interface .....	26

### 3.1 Operating Controls

This section identifies all operating controls of equipment, except the user interface which is explained in detail in section 3.

#### 3.1.1 Main Electrical Panel

The main electrical panels include most electrical components and operating controls of equipment. The operator does not have to open these panels to operate the equipment.



##### **WARNING**

**Only qualified personnel are authorized to open electrical panels.**

##### MAIN DISCONNECT SWITCH

Turning off the main disconnect switch isolates the equipment from the source of power supply. Before performing any equipment maintenance, the main disconnect switch must be turned off and locked. For more information on the lockout procedure, see [Lockout procedure](#) in the [Safety](#) chapter.



##### **WARNING**

**Always stand on the side of the panel when turning the main disconnect switch or pushing the main disconnect handle to ON.**



##### **WARNING**

**Before performing any equipment maintenance, the main disconnect switches must be turned off and locked.**



##### **CAUTION**

**When a disconnect switch is turned off, always wait at least 30 seconds before turning it back on. This waiting period will prevent variable frequency drives from creating an alarm.**

#### 3.1.2 Tower Light (Option)

Light	Equipment Operating Status	Cause / Comment
Red	The unit is rejected: the product weight is over or equal to the high acceptable limit.	Over reject

Light	Equipment Operating Status	Cause / Comment
Yellow	The unit is accepted: the product weight is over or equal to the high acceptable limit.	Over accept
Green	The unit is accepted: the product weight is good, which means that it is lower than the high acceptable limit and higher than the low acceptable limit.	Normal
Yellow	The unit is accepted: the product weight is under or equal to the low acceptable limit.	Under accept
Red	The unit is rejected: the product weight is under or equal to the low acceptable limit.	Under reject

### 3.1.3 Start up, Stop and Cancel Cycle Procedures

#### TO START THE WEIGHT CONTROLLER

1. Turn the disconnect switch to ON in order to switch on electrical power to the weight controller.
2. Verify if faults are displayed on the SpeedAC iQ screen. If this is the case, make the necessary corrections. For more information, refer to [Operation](#) Section.

#### TO STOP THE WEIGHT CONTROLLER

1. Verify if faults are displayed on the SpeedAC iQ screen. If this is the case, make the necessary corrections. For more information, refer to [Operation](#) Section.
2. Turn the disconnect switch to OFF in order to switch off electrical power to the weight controller.

## 3.2 Calibration

Refer to the Systec Calibration manual in the *Appendix* section.

## 3.3 User Interface

The user interface enables communication between the operator and the controller. This section describes most screens as well as keys, displays and parameters specific to each screen. Operating modes of the user interface are also explained.



Screen images presented in this section may slightly differ from actual display.

**WARNING**

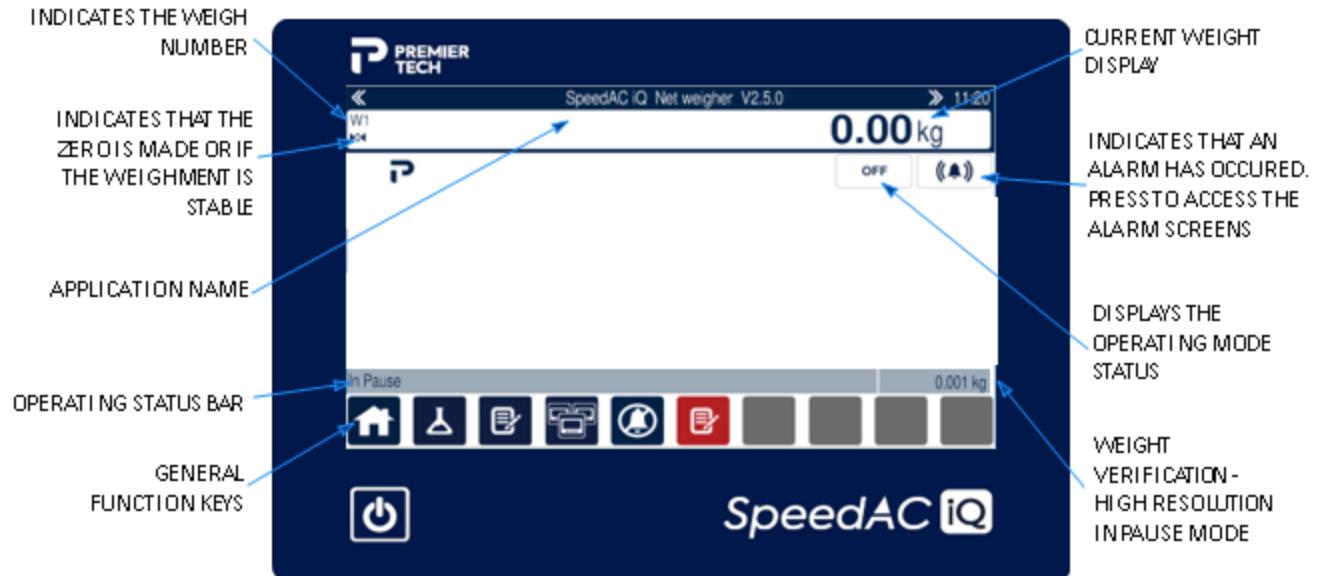
The operator must know the location and have a thorough knowledge of operating controls and safety devices before using the equipment.

### 3.3.1 General Description

This section describes displays and keys that are common to most screens. Displays and keys that are specific to a particular screen will be explained in the following sections along with the description of the screen.



The user interface is a touch screen: data input and function selection are made by a simple finger movement or pressure on the screen.



**Figure 3-1 General description**



Some keys are grey which means they are not accessible, depending on the type of access and operating mode.

#### Operating status bar

Displays the equipment operating status. When a fault is generated, the most important one is displayed.

## GENERAL FUNCTION KEYS

**Auto**

To display the **Automatic** screen to operate the equipment automatically. Live adjustments can also be performed through this screen. See section [3.3.5](#).

**Recipe**

To display the **Recipe** screen to manage the recipes. See section [3.3.6](#).

**Report**

To display the **Report** screen where data on recent and life production is provided. See section [3.3.8](#).

**Other Pages**

To access other pages and function keys. See section [3.3.2](#).

**Clear faults**

To clear alarms that have been corrected.

**Batch**

To access the **Batch configuration and report** screen.

**Off**

To put the equipment in off mode. The screen displayed remains the same but the operating status indicated in the upper right corner changes to OFF MODE. In this mode, all equipment movements and sequences are immediately stopped and reinitialized, and no further operation is possible.



The equipment remains in OFF MODE as long as no other operating mode is selected.

**Start**

To start equipment in automatic mode.

**Pause**

To pause or unpause the equipment. It replaces the **Start** key in AUTO MODE. Used to toggle PAUSE and AUTO modes. In PAUSE mode, the weighed bag(or other container) will be held onto the CONVEYOR allowing weight verification or temporary interruption. To resume, press **Pause** key again.



### Stop

To stop equipment in automatic mode. When this key is pressed, the cycle in progress comes to a stop. All actions will be completed, but no new cycle begins.



### Previous and next

To return to the previous screen and go to the next one.



### Unapproved weight display

This icon appears when weight display banner is not visible in this screen. The weight display banner is approved by the weight and measure regulations.

## OPERATING MODE STATUS

OFF MODE	Equipment is in off mode. It is the equipment initial mode at start-up. All equipment movements and sequences are immediately stopped and reinitialized, and no further operation is possible.
----------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------



The equipment remains in OFF MODE as long as no other operating mode is selected.

PREP.	Equipment is performing an initialization cycle before starting in automatic mode.
-------	------------------------------------------------------------------------------------

AUTO	Equipment is running in automatic mode.
------	-----------------------------------------

AUTO PAUSE	Equipment is paused in automatic mode. It allows verifying the real weight or it is a temporary interruption.
------------	---------------------------------------------------------------------------------------------------------------

STOPPING	The <b>Stop</b> key has been pressed in automatic mode but the equipment has not stopped yet.
----------	-----------------------------------------------------------------------------------------------

STOP	Equipment is stopped in automatic mode.
------	-----------------------------------------

## ALARM STATUS

In the right upper part of the screen, a display indicates the type of alarm the controller has generated. Refer to the **Alarms** screen section [3.3.13](#) for more information. Clicking on the status icon will bring the **Alarm history** screen.


**Yellow**

The controller has generated a warning.


**Red**

The controller has generated a fault.


**White**

The controller has generated no fault.

### 3.3.2 Other Pages and Functions



**Figure 3-2 Other pages / functions**



Some keys are grey which means they are not accessible, depending on the type of access and operating mode.

#### User level

Displays the user level (operator, supervisor, Premier Tech).

#### OTHER PAGES


**I/O Configuration**

To access the **I/O configuration** screens, where the mapping of inputs and outputs are displayed. See section [3.3.11](#)


**Fault history**

To access the **Fault history** screen. See section [3.3.13](#).

## Information

To display the **Information** screen that provides information on the equipment. See section [3.3.3](#).

## I/O Test

To access the **I/O test** screen, where the status of inputs and outputs are provided. See section [3.3.12](#).

## Machine configuration

To access the **Machine configuration** screens. See section [3.3.10](#).

## Machine parameters

To access the **Machine parameters** screens. See section [3.3.9](#).

## Access

To display the **Access** screen to change the type of access. See section [3.3.4](#).

## Flexible I/Os

To access the **Flexible I/Os** screen. See section [3.3.14](#).

## Weigh program management

To access the **Weigh program management** screen. See section [3.3.7](#).

## OTHER FUNCTIONS

### Weight check mode

To check weight of bags (or other container).

### Bypass check mode

To bypass weight checking in case of load cell damage or incompatible product. This mode will allow the CHECKWEIGHER to run as a standard conveyor.

### Auto tune

To force the Dynamic Check algorithm to auto adjust. This icon turns yellow while auto tuning is in process. This function is available in OFF mode and by Supervisor or Premier Tech passwords.

### Language

To change the HMI languages selected in the **Machine configuration** page. The selection will toggle between the 3 chosen languages. English is one by default and the other 2 are chosen languages in the **Machine configuration** settings.

## ↑ DBs

To load the databases (DBs) from USB key, if needed. This button is only available in Supervisor or Premier Tech passwords and in OFF mode.

### 3.3.3 Information Screen

The **Information** screen displays information about Premier Tech after-sales service and about the equipment.



Most of this information should be entered in the **Machine configuration** screens by Premier Tech technicians.



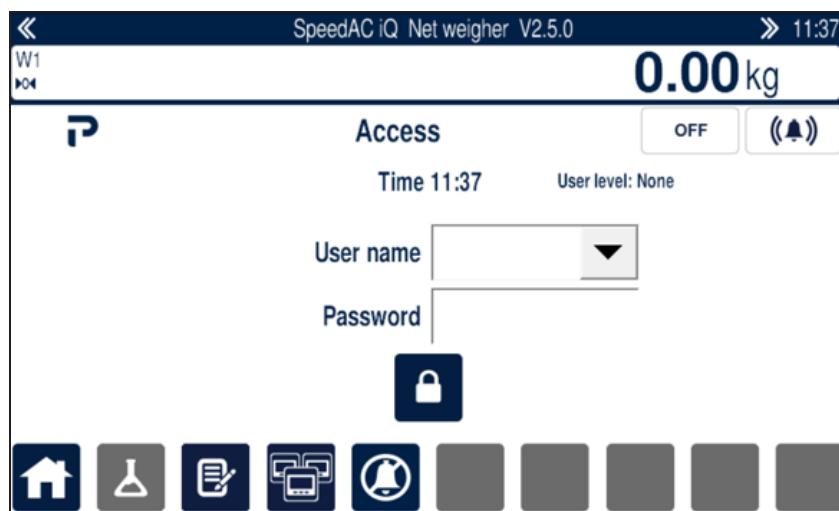
**Figure 3-3 Information screen**



Some keys are grey which means they are not accessible, depending on the type of access and operating mode.

### 3.3.4 Access

The **Access** screen is used to log in the system and to change the type of access operator, supervisor, Premier tech). A password is required to change data in some screens.



**Figure 3-4 Access screen**



Some keys are grey which means they are not accessible, depending on the type of access and operating mode.

#### FUNCTION KEYS

##### User name

To select the access level (operator, supervisor, Premier Tech).

##### Password

To enter the password (corresponding to the desired access level). To deactivate the password and return to a READ ONLY access, press the padlock key.

Password level	Actions allowed
<b>None</b>	Start equipment only (not logged in).
<b>Operator</b>	Start equipment, change recipes, modify recipes, <b>Settings</b> screens.
<b>Supervisor</b>	Start equipment, change recipes, modify recipes, <b>Settings</b> screens and reset user password.
<b>Premier Tech</b>	<b>Tech Tuning</b> screens reserved for Premier Tech technician only.



##### Padlock key

To activate and deactivate the password.

### 3.3.5 Automatic Mode

The **Automatic** screens allow the operator to run the equipment automatically and to view some operating variables.



**Figure 3-5 Automatic mode screen**



Some keys are grey which means they are not accessible, depending on the type of access and operating mode.

#### Weigh program display (Weigh program / Recipe)

Name of the current **Weigh program**.

To choose the desired **Weigh program**, press **Recipe** to display the program list. This action is possible only when the equipment is in Off mode and if the operator is logged in.

#### Target weight

Weight of a unit, based on weigh program settings.

#### Average

Average weight of all units that have occurred since the **Start** key has been pressed.

#### Standard deviation

Measure of the dispersion of units. This measure is linked to the **Average**.

#### Last checked

Weight of the last unit.

### **Units/minute**

Number of units weighed per minute.

### **Units done**

Number of units done, including the ones out of tolerance or the units/preset if using **Batch** counter.

### **Check results**

This part of the screen shows six (6) columns with the Checkweighing results. Each column has an icon to indicate the type of result (category) and is highlighted if the last check is corresponding to this category. The 2nd line shows the weight limit of this type of result and finally, the 3rd row shows how many weighments were in that category.

	<b>Underweight accept</b>
	<b>Underweight reject</b>
	<b>Good weighment</b>
	<b>Overweight accept</b>
	<b>Overweight reject</b>
	<b>Invalid weighment</b>

### **FUNCTION KEYS**



#### **Zero (not used in net weighing applications)**

To zero the weigher so that it indicates 0 when the quantity to be measured is also 0.



#### **Approved weight storage (to be used by qualified service technicians only)**

To access system pages.

### 3.3.6 Recipe



**Figure 3-6 Recipe screen (Page 1)**



Some variables are grey which means they are not accessible, depending on the algorithm and feeder type.

#### Underweight reject

Weight (or weight under) at which the unit will be rejected as an underweight.

#### Underweight accept

Weight (or weight under), but over **Underweight reject**, at which the unit will be accepted but considered an underweight accepted unit.

#### Nominal weight

Net weight of a unit.

#### Overweight accept

Weight (or weight over), but under **Overweight reject**, at which the unit will be accepted but considered an overweight accepted unit.

#### Overweight reject

Weight (or weight over) at which the unit will be rejected as an overweight.

#### Tare weight

Empty bag (or other container) weight (optional).

**Weight unit**

To select the weighing unit for a specific recipe in kg or lbs. Only kg is possible for OIML (approved) application.

**Bag length (1 – 9999 mm or inches)**

Filled bag (or other container) length in mm or inches(“) depending on **Machine Configuration** parameter system.

**Dynamic offset**

Weight value to compensate the difference from dynamic weight to static weight, if any. Enter negative value if **Dynamic weight** is higher than **Static weight**. Enter positive value if dynamic weight is lower than static weight. To adjust it, take an average of the same bag (minimum 10 times) in dynamic and compare to the static weight of this bag on the **CHECKWEIGHER**. Using the pause mode allow to read the High resolution weight in the lower right corner of the **Auto** screen, for averaging purpose. This parameter is only available for Premier Tech representative.

**Reject configuration**

Configuration of the **Reject unit** output.

Set to **Both**, units will be rejected unit for both **Underweight** and **Overweight**.

Set to **Underweight**, units will be rejected unit for **Underweight** only.

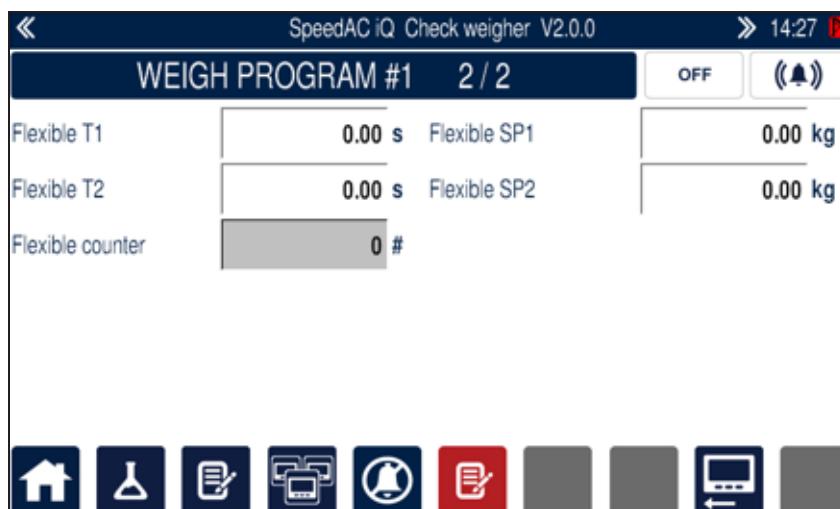
Set to **Overweight**, units will be rejected unit for **Overweight** only.

**Reject unit delay (0 – 10 s)**

Delay prior to activate **Reject unit** output.

**Reject unit time (0 – 10 s)**

Activation time of **Reject unit** output.



**Figure 3-7 Recipe screen (Page 2)**



Some variables are grey which means they are not accessible, depending on the algorithm and feeder type.

#### **Flexible T1**

Available timer 1 preset value used for flexible I/Os programming.

#### **Flexible T2**

Available timer 2 preset value used for flexible I/Os programming.

#### **Flexible counter**

Available counter preset value used for flexible I/Os programming.

#### **Flexible SP1**

Available setpoint 1 used for flexible I/Os programming.

#### **Flexible SP2**

Available setpoint 2 used for flexible I/Os programming.

### **3.3.7 Weigh Program Management**

The **Weigh program management** screen displays the weigh program currently used. A weigh program (recipe) is comprised of the parameters values used to weigh one or many selected products. This screen includes the copy tool in order to rename or copy weigh programs. The **Weigh program management** functions are available in OFF mode only.



**Figure 3-8 Weigh program management screen (COPY)**

#### Source weigh program

Press the selection field to choose the **Weigh program** name source (which weigh program will be copied to create a new one).

#### Destination weigh program

Press the selection field to choose the **Weigh program** name destination (where the weigh program will be copied).

#### TO COPY A WEIGH PROGRAM/RECIPE

1. Select the **Source weigh program**.
2. Select the **Destination weigh program**.
3. Press **Copy** ().

**TO CHANGE A RECIPE NAME**


**Figure 3-9 Weigh program management screen (RENAME)**

1. Select the **Source weigh program name**.
2. Enter the **New name**.
3. Press **Rename** ().

**TO DELETE A RECIPE**


**Figure 3-10 Weigh program management screen (DELETE)**

1. Select the **Weigh program to delete**.
2. Press **Delete** ().

### 3.3.8 Production Report

The **Production report** screen displays, on the left side, data related to the active **Weigh Program** since reset and, on the right side, the production data accumulated since the first use of the CHECKWEIGHER.



Figure 3-11 Production report screen

#### SINCE RESET

##### Nominal weight

Weight of a unit.

##### Units done

Total number of units done since reset.

##### Total weight

Total weight of checked units since reset.

##### Underweight reject

Number of units (and percentage of units done) that meets the **Underweight reject** weigh program value criterias.

##### Underweight accept

Number of units (and percentage of units done) that meets the **Underweight accept** weigh program value criterias.

##### Units accepted

Number of units (and percentage of units done) that is over the **Underweight accept** weigh program value AND under the **Overweight accept** value.

**Overweight accept**

Number of units (and percentage of units done) that meets the **Overweight accept** weigh program value criterias.

**Overweight reject**

Number of units (and percentage of units done) that meets the **Overweight reject** weigh program value criterias.

**Invalid weighments**

Number of units (and percentage of units done) that could not be evaluated.

**CUMULATED PRODUCTION****Total units**

Number of units done since the first use of the CHECKWEIGHER.

**Total weight**

Weight of stocked product since the first use of the CHECKWEIGHER.

**FUNCTION KEYS****Batch**

To access the **Batch configuration and report** screen.

**Printer**

To print the current **Report** page (option).

**Weighing data**

To access the **Weighing data** screen where weighing data is provided.

**Reset**

To reset the all lifetime production data.

**Reset**

To reset the since reset counters.

**WEIGHING DATA**

The **Weighing data** window allows viewing the weight, tolerance, limit, evaluation and time of the last ten bags.

Weighing Data				
Weight	Tol	Limit	Evaluation	Time
25.00kg	==	25.00kg	0.57sec	15:25:03
25.00kg	==	25.00kg	0.61sec	15:25:00
25.00kg	==	25.00kg	0.61sec	15:24:57
25.00kg	==	25.00kg	0.58sec	15:24:54
25.00kg	==	25.00kg	0.57sec	15:24:51
25.00kg	==	25.00kg	0.60sec	15:24:48
25.00kg	==	25.00kg	0.60sec	15:24:45
25.00kg	==	25.00kg	0.61sec	15:24:42
25.00kg	==	25.00kg	0.57sec	15:24:39
25.00kg	==	25.00kg	0.61sec	15:24:36

**Figure 3-12 Weighing data window**



**Figure 3-13 Batch report screen**

#### Batch name

Enter the desired batch name (up to 24 characters).

#### Details

Enter the text details for this batch (up to 48 characters).

#### Preset

Enter the desired batch preset.

#### Nominal weight

Net weight of the unit content.

#### Average

Average weight for the current batch.

**Standard deviation**

Standard deviation weight for the current batch.

**Total weight**

Total cumulated weight for the current batch.

**Underweight reject**

Number of units (and percentage of units done) that meets the **Underweight reject** weigh program value criterias for the current Batch.

**Underweight accept**

Number of units (and percentage of units done) that meets the **Underweight accept** weigh program value criterias for the current Batch.

**Units accepted**

Number of units (and percentage of units done) that is over the **Underweight accept** weigh program value AND under the **Overweight accept** value for the current Batch.

**Overweight accept**

Number of units (and percentage of units done) that meets the **Overweight accept** weigh program value criterias for the current Batch.

**Overweight reject**

Number of units (and percentage of units done) that meets the **Overweight reject** weigh program value criterias for the current Batch.

**Invalid weighments**

Number of units (and percentage of units done) that could not be evaluated for the current Batch.

**Units done**

Total number of units done for the current Batch.

### 3.3.9 Machine Parameters

The **Machine parameters** screen displays all functional parameters of the CHECKWEIGHER. A password is required to access this screen.



**Figure 3-14 Machine parameters (page 1)**



Some variables are grey which means they are not accessible, depending on the algorithm and feeder type.

#### **Entry photocell timeout (0 – 99 s)**

Period of time allowed for unit to pass in front of Entry photocell. If this timer elapses before the unit clears photocell, a fault is generated. Enter 0 to disable this function.

#### **Exit photocell timeout (0 – 99 s)**

Period of time allowed for unit to pass in front of Exit photocell. If this timer elapses before the unit clears photocell, a fault is generated. Enter 0 to disable this function.

#### **Autotune function (OFF/ON)**

This is used to allow or not, the usage of the **Autotune** function in **Other Pages and Functions** screen. This function can only be changed by a Premier Tech representative.

#### **Screen saver time (Light off of service mode)**

If terminal is not in use, the backlighting is switched off after this time has elapsed (in minutes). Touch the screen to switch backlighting on again. Enter 0 to disable this function. Power cycle is required for this value to take effect.

#### **Photocell distance (1 – 9999 mm or inches)**

Measured distance, in mm or inches depending on the **System** parameter in the **Machine Configuration** screen, between Entry and Exit photocells of the CHECKWEIGHER. Used for calibration purpose. This value is displayed only. It is the Service Mode-Calibration, Dyn. Cal. **Speed Distance**.

### Belt Speed (0.1–1.25 m/s or 20-246 '/min)

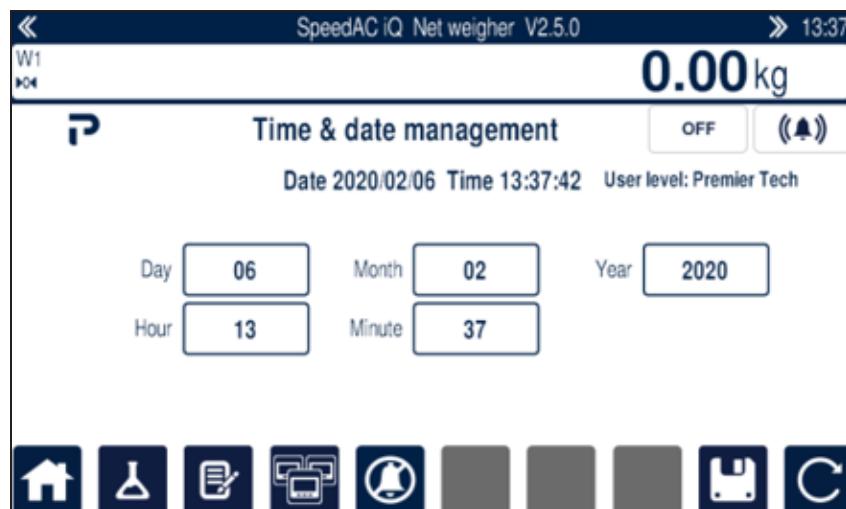
Measured belt speed of the CHECKWEIGHER in m/s or '/min depending on the **System** parameter in the **Machine Configuration** screen. Used for calibration purpose.

#### FUNCTION KEYS



##### **Set time and date**

To set the time and date through the **Time & date management** screen.



**Figure 3-15 Time & date management screen**



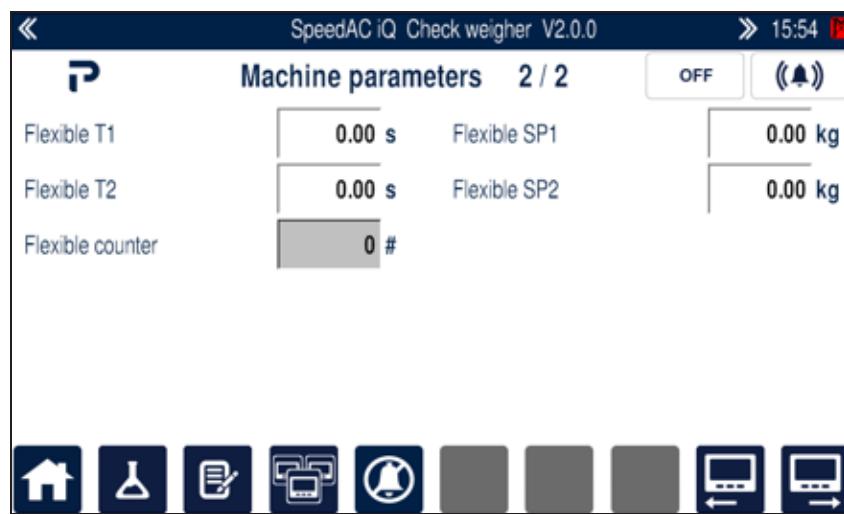
##### **Save**

To permanently save all changes made in the screen.



##### **Refresh**

To copy the system values into the boxes.



**Figure 3-16 Machine parameters (Page 2)**

#### **Flexible T1**

To set the timer 1 preset value used for flexible I/Os programming.

#### **Flexible T2**

To set the timer 2 preset value used for flexible I/Os programming.

#### **Flexible counter**

To set the counter preset value used for flexible I/Os programming.

#### **Flexible SP1**

To set the setpoint 1 used for flexible I/Os programming.

#### **Flexible SP2**

To set the setpoint 2 used for flexible I/Os programming.



**Figure 3-17 Machine parameters (Save/restore default)**

#### **Save machine parameters**

To permanently save all **Machine parameters** to default location (Premier Tech Only).

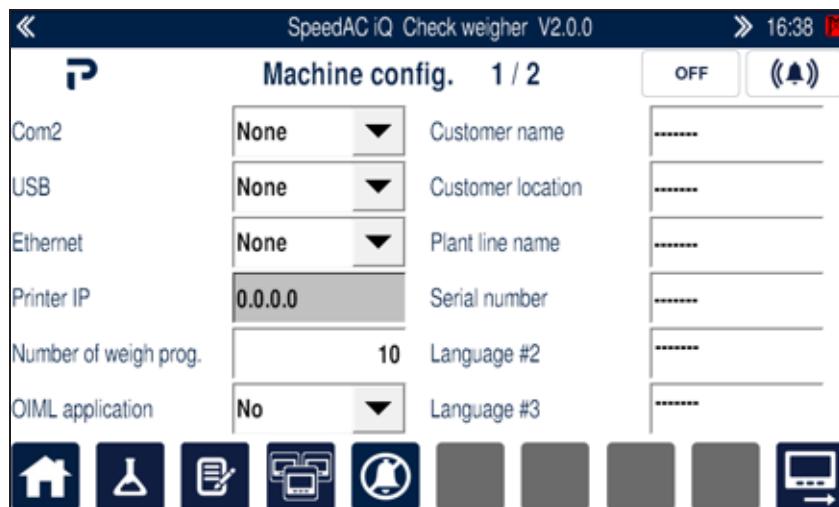
#### **Restore default parameters**

To copy the default parameters into the **Machine parameters** values (Premier Tech Only).

### **3.3.10 Machine Configuration**

The machine configuration must be performed during initial commissioning of the weighing system and after a major change to the controller.

To access this screen, enter the **Machine Configuration** password (M.C.) if required and press the **Enter** key.



**Figure 3-18 Machine configuration (Page 1)**



Some variables are grey which means they are not accessible, depending on the algorithm and feeder type.

#### Com2

To choose the printing/reporting option for port **Com2**. Choose from **Continuous output**, **Unit record string**, **Unit record file**, **Report to printer**, or select **None** to disable this parameter. Refer to the [Appendix](#) section for more information.

#### USB

To choose the printing/reporting option for port **USB**. Choose from **Continuous output**, **Unit record string**, **Unit record file**, **Report to printer**, or select **None** to disable this parameter. Refer to the [Appendix](#) section for more information.

#### Ethernet

To choose the printing/reporting option for port **Ethernet**. Choose from **Continuous output**, **Report to printer**, or select **None** to disable this parameter. Refer to the [Appendix](#) section for more information.

#### Printer IP

To enter the printer IP Address. Refer to the [Appendix](#) section for more information.

#### Number of weigh programs (1 – 30)

Number of defined weigh programs. There are 100 weigh programs available, this setting limits the quantity displayed.

### OIML application

To activate (ON) or deactivate (OFF) if the application is OIML approved. If it is ON, the Zero limit is set to 1.9% and the Disable auto zero is forced to OFF.

### Plant line name / Serial number / Customer name / Customer location

Customer specific machine information.

### Language #2 & #3

Desired languages of the user interface. To allow quick selection of language see **Other Pages and Functions** screen.

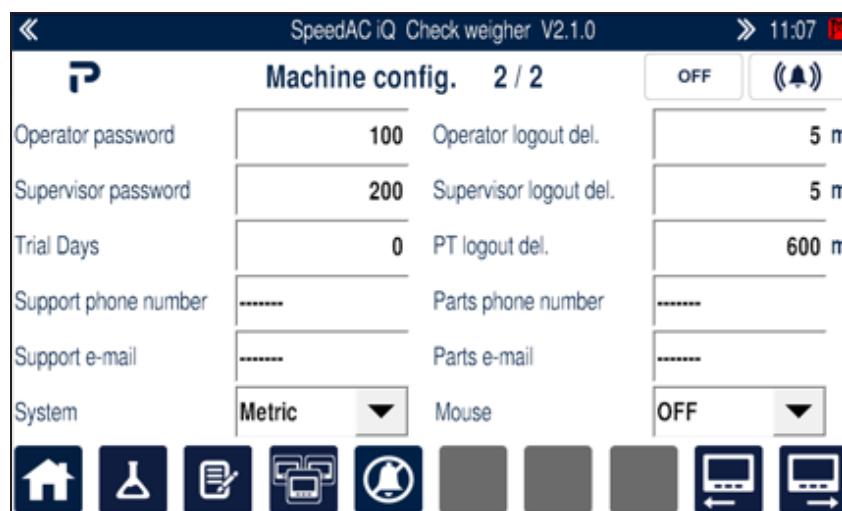


Figure 3-19 Machine configuration (Page 2)



Some variables are grey which means they are not accessible, depending on the algorithm and feeder type.

### Operator / Supervisor password

To change passwords. A valid password is necessary to do so.

### Trial days

Trial period in days to allow on site testing. 0 value disables the function and allows continuous operation.

### Support phone number/ E-mail

Displays Premier Tech service department information.

### System (Metric / Imperial)

Measurement system used for length and speed values in **Weigh Program** and **Machine Parameter** settings.

### Operator / Supervisor / Premier Tech logout delay

To set the passwords logout delay.

### Parts phone number/ E-mail

Displays Premier Tech parts department information.

### Mouse

To enable or disable the use of a USB-type mouse for screens navigation. This will also enable the cursor in the screens. When the mouse is enabled, the touch screen still remain active. This feature is useful especially in hazardous location where the controller cannot be exposed to the harsh environment. A power cycle might be needed when switching on this option.



**Figure 3-20 Machine configuration (Save/Restore default)**

#### Save machine configuration

To permanently save all **Machine configuration** to default location (Premier Tech Only).

#### Restore default configuration

To copy the default configuration into the **Machine configuration** values (Premier Tech Only).

### 3.3.11 I/O Configuration

The **I/O Configuration** screens display the mapping of input and output addresses (0 to maximum of I/Os configured in the Service Mode).

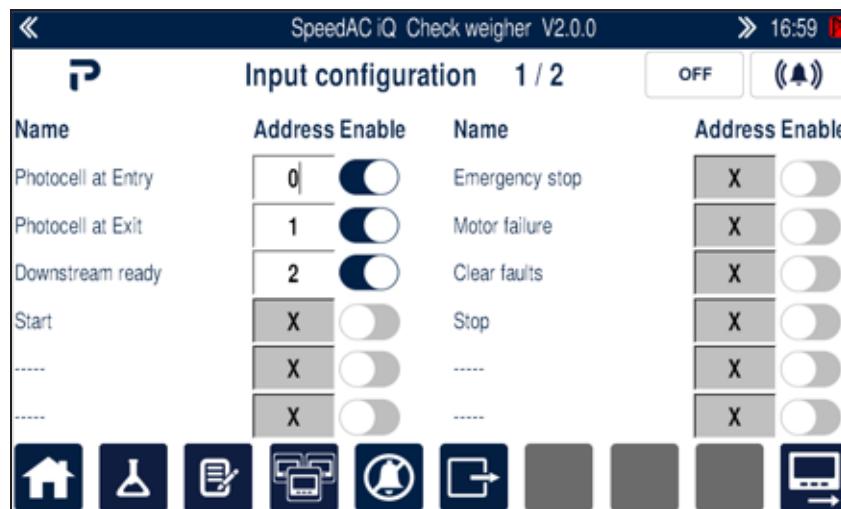


Figure 3-21 Input configuration (Page 1)

### Input

To access the **Input configuration** screen.

### Output

To access the **Output configuration** screen.

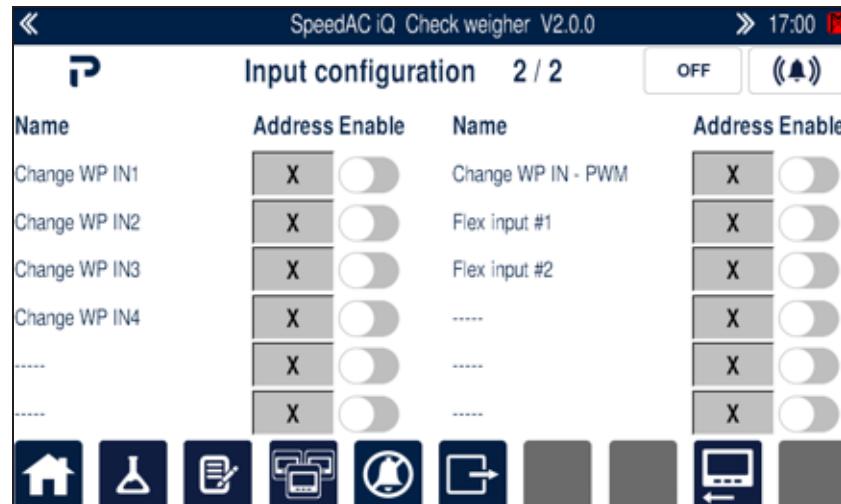
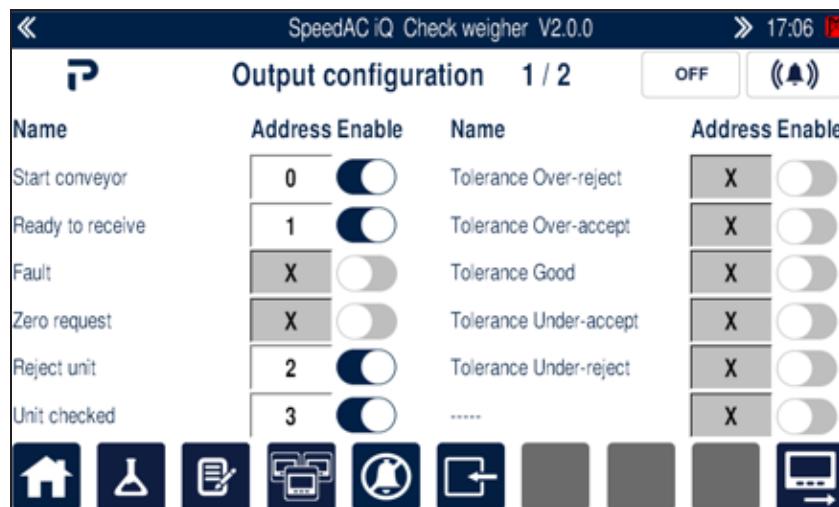
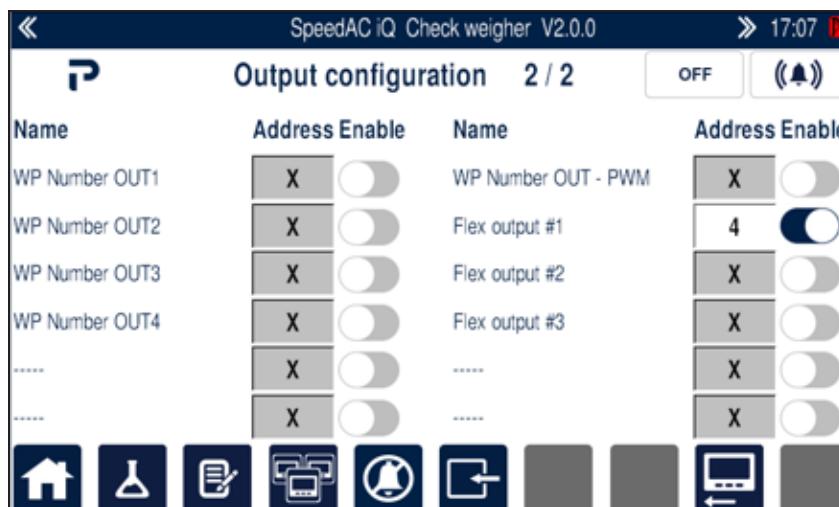


Figure 3-22 Input configuration (Page 2)



**Figure 3-23 Output configuration (Page 1)**



**Figure 3-24 Output configuration (Page 2)**

### 3.3.12 I/O Test

The **I/O test** screens display the controller input and output status. Inputs and outputs are grouped and displayed by card (0, 2 or 4). Unused cards will not be displayed.



Figure 3-25 Input test (Page 1)

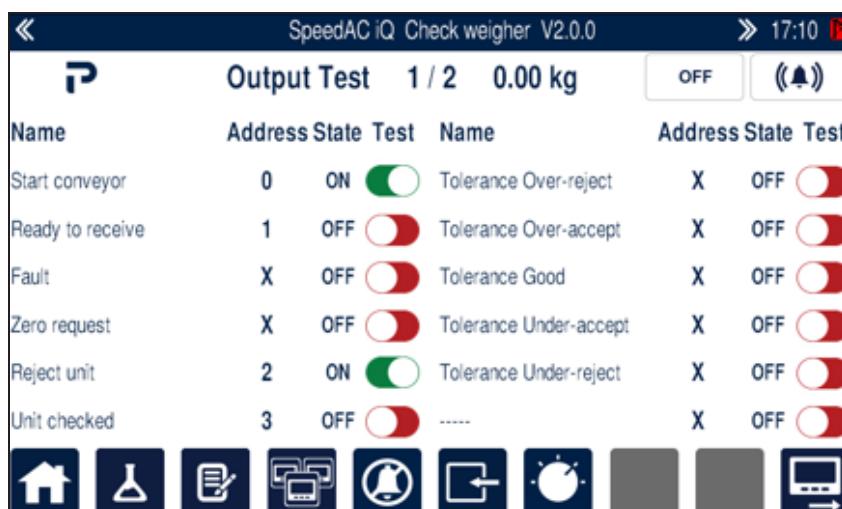


Figure 3-26 Output test (Page 1)



### Analog page

To access the **Analog test** screen that displays the controller inputs values and allow to send values to the outputs.



**Figure 3-27 Analog test**

#### **Name**

Input or output name display.

#### **Address**

Input or output address display.

#### **State**

Input status, and to modify the output status using the selection field.

#### **Test**

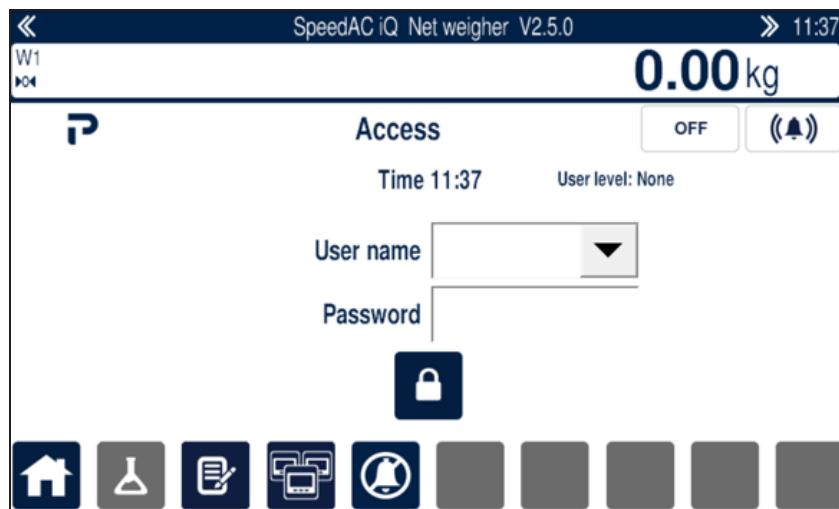
Turn ON or OFF the corresponding digital output.

#### **Value**

Value read from Analog Input or to be sent to Analog output.

### **3.3.13 Alarms**

The **Alarms** lists all active alarms. This section describes the types of alarms and explains how to clear them. To get a list of all alarm messages that can be generated by the controller, refer to the [Troubleshooting](#) section.



**Figure 3-28 Active fault screen**

The controller can generate four types of alarms:

- **General faults (G)** bring all modules to an immediate stop, which means the cycle in progress is interrupted. These faults have to be cleared to restart operation.
- **Stop faults (S)** bring all modules to a stop, but only at the end of the cycle in progress. These faults have to be cleared to resume operation.
- **Blocking faults (B)** bring the faulted module to a stop. Modules that are not affected continue to operate until their cycle is completed or until an interaction with the faulted module is needed. These faults have to be cleared to resume operation.
- **Warnings (W)** provide information on operations without stopping the module or equipment. In some cases, the module or equipment is waiting and will automatically restart if the problem is resolved within a certain time. If the problem is not resolved in this delay, the controller will then generate a stop or blocking fault.

**WARNING**



Take care when the controller generates a warning. The equipment or module may automatically restart.

**TO CORRECT AN ALARM**

1. When an alarm occurs, the **Alarm** key (at the upper right corner of the screen) turns red or yellow. Press this key to open the **Alarms**.
2. Read the alarm messages and make the necessary corrections. To get a detailed description and actions required to correct the alarm, refer to **Alarm messages** in the **Troubleshooting** section.

3. Press to clear the corrected alarms. Unresolved alarms will remain displayed.
4. If required, press to restart the equipment.

### 3.3.14 Flexible I/Os

The **Flexible I/Os** screen allows to set up the flexible inputs and outputs. This page is accessible when the **Flexible Input** and **Output** are enabled (**Input/Output Configuration** screens). Flexible outputs are going to cycle only in Auto mode.

**FLEXIBLE OUTPUT #1 AND #2 CAN BE CONFIGURED AS FOLLOW:**



Figure 3-29 Flexible output #1 screen

#### Contact Type

To choose the on and off contact type (**Input /Output/Weight setpoint**).

#### Weight setpoint

To set the on and off **Weight setpoint** (if **Weight setpoint** is selected as **Contact type**). It can be smaller than/greater than Weigh program or Machine parameter setpoint 1 or 2 (refer to **Weigh program 4** or **Machine parameter 3** screens).

#### I/O name

To choose the I/O (among the input/output enabled) that will be used as the flexible I/O.

#### Switch State

Switch state of the **Contact (Input /Output)** to turn ON or OFF the flexible Output #1 or #2 related.

## Timer

To set the flexible I/O timer. This timer will be triggered when the **Contact** reaches the **Switch state** if it is an Input or Output or when weigh setpoint condition is reached. It lasts during the **Flexible T1/T2** setpoint (refer to **Weigh program 4** (Recipe 4) or **Machine parameter 3** screens). If this parameter is set to **None**, no timer will start, the flexible I/O will be activated(deactivated) as soon as the **Contact** reaches the **Switch state**.

**FLEXIBLE OUTPUT #3 CAN BE CONFIGURED AS FOLLOW:**



**Figure 3-30 Flexible output #3 screen**

### Count mode

To choose the between **Pulsing** and **Preset** mode.

**Preset:** After counting the number of events, entered in the selected Preset source, defined by **Contact type** and **I/O name**, the Flexible Output #3 will be cycled once, according to the Timers.

**Pulsing:** After one trigger of the event defined by **Contact type** and **I/O name**, the Flexible Output #3 will be cycled according to the Timers for a number of times entered in the selected Preset source.

### Contact type

To choose the contact type (**Input /Output**).

### I/O name

To choose the I/O (among the input/output enabled) that will be used as the flexible I/O.

#### Preset source

To choose if the counter preset will be from the **Machine parameters** or the **Weigh program** flexible counter.

#### Initial delay

Amount of time before turning Flexible Output #3 to ON after conditions are met.

#### ON time

Amount of time the Flexible Output #3 will stay ON after Initial delay and after OFF state in Pulsing mode.

#### OFF time

Amount of time the Flexible Output #3 will stay OFF coming from ON state (only used in Pulsing mode).

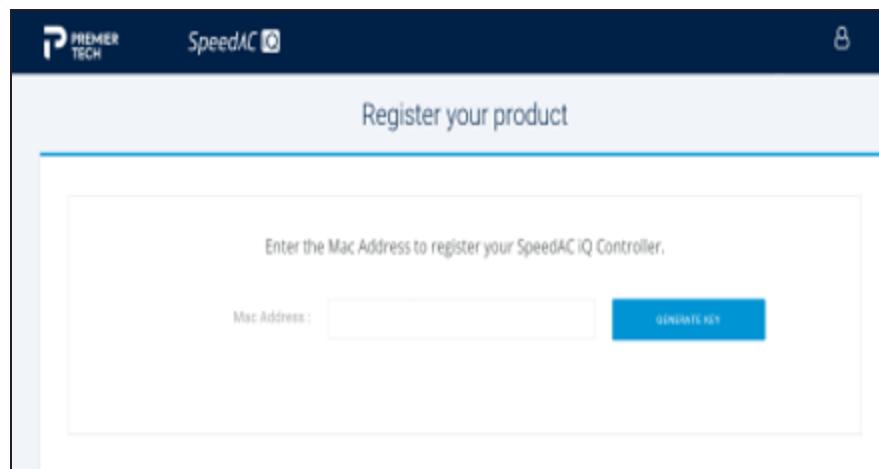
### 3.3.15 Registration

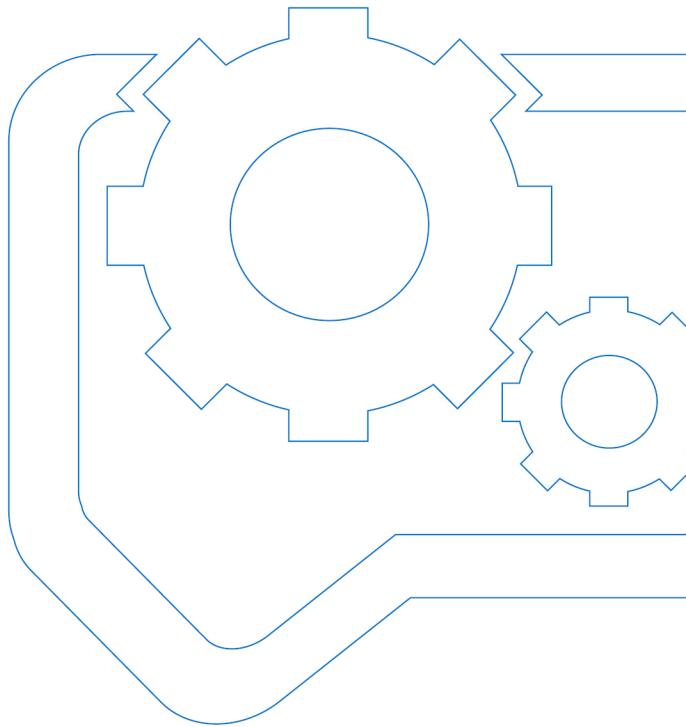
The **Registration** screen displays the **Mac Address** of the controller and allow the **Registration Key** to be entered. If registration have never been made or the controller flash memory got corrupted, the following screen will appear:



**Figure 3-31 Registration screen**

Visit the following website to get your **Registration Key**:  
<https://speedaciq.ptchronos.com/#/registration>.





## 4 Troubleshooting

4.1 Electrical Devices Check .....	62
4.2 Alarm Messages .....	63
4.3 Major System Error .....	66
4.4 Major System Warning .....	69


**WARNING**

Only qualified personnel are authorized to open electrical panels.

## 4.1 Electrical Devices Check

When an alarm occurs, electrical devices to be checked (sensors, valves, etc.) are identified in the [Troubleshooting](#) list provided at the end of this section. The following procedure explains how to check if the electrical devices are working properly.

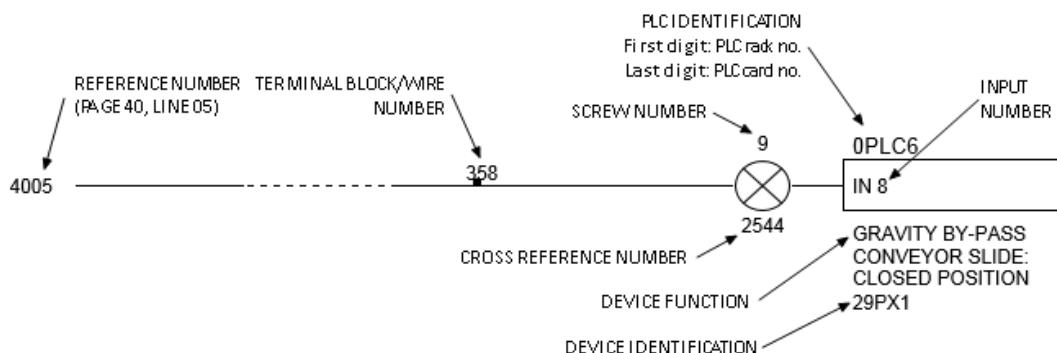
1. On the electrical parts list, identify the device (**Device Id.**) and its electrical drawings reference number(**Line No.**):

Device Id.	Installation	Location	Line No.	Part No.	Description	Manufacturer
29PX1		+MA	40.05	24500809	INDUC PROX. SENSOR	A-B



The device mentioned above is used as an example and does not necessarily apply to your equipment.

2. Find out the reference number on the electrical drawings (see the diagram below). This number is always located at the extreme left of the page.
3. Identify the PLC card number, input or output number and status light, as well as the terminal block. Wires do not have unique numbers but rather bear tags indicating their source and target terminal screws. Note that the following example is for an input. For outputs, the diagram is mirror-imaged.



4. Manually activate the device and check if the corresponding status light turns on (or turns off according to the type of device). If not, the device itself or the wiring between the device and the PLC card might be defective.
5. Make the necessary corrections.

## 4.2 Alarm Messages

The following document lists all alarm messages that can be generated by the controller, along with the actions required to correct them. For the sake of conciseness, these descriptions do not include the steps “Clear alarm” and “Restart equipment” that are required to resume operation after an alarm occurs (except for warnings). For information on these two procedures, refer to the [Operation](#) chapter.

To know how to check if the electrical devices identified in this list are working properly, see section [4](#).

## ALARM MESSAGES

<b>Code</b>	<b>Name, description and actions necessary</b>
(G)	<p><b>EMERGENCY STOP</b></p> <p>An <b>Emergency stop</b> button or a pull cord has been activated.</p> <p>Make the appropriate corrections (if required), reset the emergency-stop button or pull cord, then press the <b>Emergency-stop reset</b> button if present.</p>
(G)	<p><b>SYSTEM ERROR</b></p> <p>The error message <i>System error #xxx description</i> is triggered under different system conditions. Please consult the <a href="#"><b>Major System Error</b></a> for more details.</p> <p>Modify the related parameters and try to restart. If problem persists, contact Premier Tech technical support.</p>
(G)	<p><b>EXCEEDED CAPACITY</b></p> <p>The product weight on the <b>WEIGHING CONVEYOR</b> exceeds the controller capacity. The bag (or container) is too heavy for the system.</p> <p>Make sure the product to be weighed is within the controller's configured capacity. Find the cause of the product abnormal weight and correct the situation.</p>
(G)	<p><b>MOTOR FAILURE</b></p> <p>One or many motors is overloaded or the variable frequency drive (VFD) that controls the motor of the <b>WEIGHING CONVEYOR</b> is malfunctioning.</p> <p>Check the overload relay. Find the cause of the overload (electrical malfunction or mechanical obstruction), and correct the situation. Reset the overload relays and check in the <b>I/O Test</b> screen if the motor overloads again.</p> <p>Check the error message for the VFD that controls the motor of the <b>WEIGHING CONVEYOR</b> and refer to the drive manual to find out the actions required. Find the cause of the fault (electrical malfunction or mechanical obstruction) and correct it.</p>
(B)	<p><b>BOTH PHOTOCELLS BLOCKED</b></p> <p>The photocells of the <b>WEIGHING CONVEYOR</b> were blocked, when trying to start the checkweigher.</p> <p>Check if both photocells are blocked. If yes, free one of them. If no, check the photocell sensor, its adjustment, its wiring and the status of the controller input.</p>
(B)	<p><b>ENTRY PHOTOCELL OBSTRUCTED TOO LONG</b></p> <p>The entry photocell of the <b>WEIGHING CONVEYOR</b> was blocked for too long, when bag was passing along.</p> <p>Check if <b>Machine parameter</b> value of <b>Entry photocell timeout</b> is correctly adjusted. If no, adjust it. If yes, check the photocell sensor, its adjustment, its wiring and the status of the controller input.</p>
(B)	<p><b>EXIT PHOTOCELL OBSTRUCTED TOO LONG</b></p> <p>The exit photocell of the <b>WEIGHING CONVEYOR</b> was blocked for too long, when bag was passing along.</p> <p>Check if <b>Machine parameter</b> value of <b>Exit photocell timeout</b> is correctly adjusted. If no, adjust it. If yes, check the photocell sensor, its adjustment, its wiring and the status of the controller input.</p>

## ALARM MESSAGES

<b>Code</b>	<b>Name, description and actions necessary</b>
(S)	<b>STABILIZATION TOO LONG</b> <p>The stabilization of the WEIGHING CONVEYOR is too long, which is usually due to vibration.</p> <p>Check if something is touching the WEIGH CONVEYOR. Check if the structure is abnormally moving.</p>
(S)	<b>ZERO OUT OF RANGE</b> <p>The controller can not indicate zero even if the <b>Zero</b> function (key on the user interface or from program) has been attempted, because the value is too high to be accepted as a zero.</p> <p>Check if there is product accumulation inside and around the WEIGHING CONVEYOR frame. Check if something comes into contact with the WEIGHING CONVEYOR. Make sure the WEIGHING CONVEYOR is empty and try to zero again. If it is not working, try to zero again using the controller calibration procedure described in the <i>Systec Calibration manual</i>.</p>
(S)	<b>TRANSPORT BELT DETECTION ERROR</b> <p>The controller detected 2 successive units in invalid weighing position to each other.</p> <p>Verify the distance between two units. Correct the situation and restart. Verify the Service Mode Dynamic Calibration Check <b>Parameter Off-distance [mm]</b> and <b>Speed distance [mm]</b>. Verify also <b>Belt Speed</b> in <b>Machine parameter 1</b> screen.</p>
(S)	<b>TRANSPORT BELT SPEED ERROR</b> <p>The controller detected invalid transport belt speed.</p> <p>Verify that the belt did not stop during the weighing cycle. Verify that unit lengths are consistent.</p> <p>Verify the Service Mode Dynamic Calibration Check <b>Parameter Speed Tol.+ [%]</b>, <b>Speed Tol. [%]</b> and <b>Speed distance [mm]</b>. Verify also <b>Belt Speed</b> in <b>Machine parameter 1</b> screen.</p>
(W)	<b>SYSTEM WARNING 1##</b> <p>The controller has not been able to zero (0) the checkweigher.</p> <p>Refer to Major System Warning table for more details. If problem persist, contact Premier Tech technical support.</p>
(W)	<b>SYSTEM WARNING 115</b> <p>The CONTROLLER has not been able to zero (0) the scale because the value is too high and is out of range - out of the limits Pb+ and PB- (Calibration in Service Mode). Refer to Systec Calibration manual for more details.</p> <p>Check if there is product accumulation inside and around the weighing conveyor frame. Check if something comes into contact with the weighing conveyor. Make sure the weighing conveyor is empty and try to zero again. If it is not working, try to zero again using the controller calibration procedure described in the Systec Calibration manual.</p>

## 4.3 Major System Error

<b>System error code</b>	<b>Description</b>
201	FILLING TASK STOPPED  Fault related to the filling task. Restart the controller and if the problem persists, contact Premier Tech technical support.
202	LOGIC OPERATION TASK STOPPED  Fault related to the logic operation task. Restart the controller and if the problem persists, contact Premier Tech technical support.
203	TWO OUTPUTS CONFIGURED WITH SAME ADDRESS  There is a conflict between the outputs. They must be set to different addresses.
300	VERIFY DATABASES: COULD BE DAMAGED OR EMPTY  This fault is displayed on power-up, when The DBs are detected to be empty. DBs can be loaded manually from the USB key, if present.
301	WP NOT CONFIGURED OR DATABASE NOT LOADED  There is a minimum <b>Recipe</b> parameter to set. To correct this fault, you must put a value other than 0 in <b>Nominal weight</b> and <b>Bag length</b> parameters. Depending on the application used, other parameters will have to be set.
302	I/Os NOT CONFIGURED OR DATABASE NOT LOADED  There is a minimum I/Os parameter to set. You must set the I/Os <b>Start Conveyor</b> , <b>Ready to Receive</b> and <b>Downstream ready</b> . Depending on the application used, other parameters will have to be set.
303	MC NOT CONFIGURED OR DATABASE NOT LOADED  There are minimum <b>Machine Configuration</b> parameters to set. <b>Feeder Type</b> and <b>Number of weigh program</b> parameters must be set in page <b>Machine configuration</b> . Depending on the application used, other parameters will have to be set.
304	MP NOT CONFIGURED OR DATABASE NOT LOADED  There are minimum <b>Machine Parameter</b> parameters to set. Make sure the value into the parameters <b>Photocells distance</b> is more than 0. Depending on the application used, other parameters will have to be set.
306	WP SELECTION INPUTS MISMATCH  Both WP selection input methods are selected. Please use only one: either PWM or the BCD method.

<b>System</b>	
<b>error code</b>	<b>Description</b>
307	DIGITAL IO ERROR – GROUP NUMBER X  This error is due to a wrong configuration of the digital IOs in the service mode. Enter in the service mode, go on Service: Config. Select Config. Digital IO, check if the group number X is correctly set. If you have REL module connected to that group, make sure the good port is selected. If the problem persists, check the wiring. Refer to Systec IT8000ET manual and REL485 manual for more details.
311	DATABASES: WP ACCESS REQUEST TIMEOUT  There is an access error at the base of the WP databases in the controller's memory.
312	DATABASE: MP ACCESS REQUEST TIMEOUT  There is an access error at the base of the MP databases in the controller's memory.
313	DATABASE: MC ACCESS REQUEST TIMEOUT  There is an access error at the base of the MC databases in the controller's memory.
314	DATABASE: FLEXIO ACCESS REQUEST TIMEOUT  There is an access error at the base of the FlexIO databases in the controller's memory.
321	CONTINUOUS OUTPUT: NOT SET IN SERVICE MODE  Make sure the continuous output is configured in the service mode (General) before selecting it. Refer to chapter Printing and Reporting in appendices.
322	CONTINUOUS OUTPUT: SM VS MC PORT MISMATCH  Check in the service mode, in General group, if the serial interface is correctly set.
323	CONTINUOUS OUTPUT: MC PORT CONFLICT  There is a port conflict in <b>Machine Configuration</b> page. <b>Com2</b> and <b>Ethernet (Machine Configuration page)</b> cannot both be set to <b>Cont. Out</b> .
324	FIELDBUS MISMATCH: CONFIGURATION VS INSTALLED MODULE  <b>Fieldbus Communication</b> settings is wrong. Check in the Service Mode, in Configuration Group, that the Fieldbus is correctly set according to module connected to expansion slot.
330	TRIAL PERIOD ELAPSED-CONTACT PREMIER TECH  Only accessible by a PT technician. 0 will disable this function.
411	SCALE #1 ONLY IQ FEEDING DRIVER PERMITTED  The Scale driver is not permitted for the <b>CHECKWEIGHER</b> application. Select the allowed driver to correct this fault. Enter in the service mode, go to Service: Configuration. Select Config. Scale, in Scale 1 group, select ADM CHECK as driver.
412	SCALE #2 ONLY LBS DRIVER PERMITTED  Lbs is not selected in the service mode. The Scale driver #2 must be lbs. Enter in the service mode, go to Service: Configuration. Select Config. Scale, in Scale 2 group, select lbs as driver.

System	error code	Description
	431	SCALE #1: WRONG SCALE DRIVER  The selected scale driver is not permitted for the Feed algorithm type. The only driver permitted are iQ feeding, lbs, iQ Sim, and ADM.
	432	SCALE #2: WRONG SCALE DRIVER  The selected scale driver is not permitted for the Feed algorithm type. The only driver permitted are ADM, ADM CHECK, lbs, iQ Sim, and None.

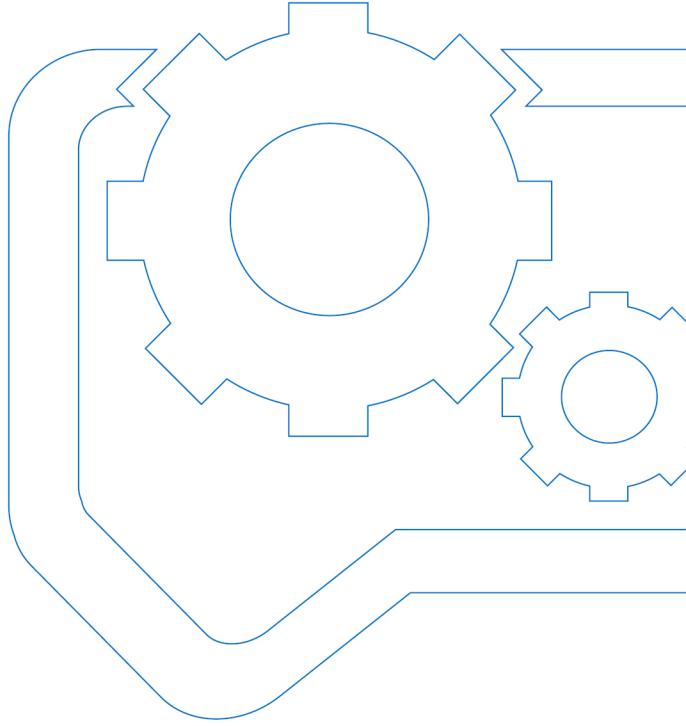
## 4.4 Major System Warning

### System warning code Description

0	NO ERROR, ACTION SUCCESSFULLY
11	NO RESPONSE FROM SCALE
12	SCALE OVERLOADED
13	SCALE NOT SETTLED
14	SCALE NOT AVAILABLE
15	TARING ERROR
20	SCALE UNDERLOADED
21	SCALE NOT LEVELED, SIGNAL FROM INCLINE SWITCH
22	SCALE NOT IN ZERO-SETTING RANGE AFTER POWER-UP
23	SCALE IN MOTION AFTER POWER-UP
24	SCALE NOT CALIBRATED, CALIBRATION DATA CHECK SUM ERROR
11 to 24	For more details refer to Systec calibration manual ADM in appendices.
40	WEIGHING MODULE NOT INSTALLED
41	INTERNAL COMMUNICATION ERROR
42	SCALE NOT PRE-CALIBRATION (FACTORY CALIBRATION)
65	TIMEOUT
66	TERMINAL IN SERVICE MODE
40 to 66	For more details refer to Systec technical manual IT8000ET in appendices.
501	DESTINATION PORT NAME: CANNOT OPEN FILE
503	DESTINATION PORT NAME FULL
504	DESTINATION PORT NAME: CANNOT OPEN DIR.
510	PORT NAME CONNECTION LOST
511	PORT NAME PRINTER CONNECTION LOST
512	UNIT RECORD FIFO STACK FULL
750	DYN CHECK: NO WEIGHT DETECTED
751	DYN CHECK: NO DATA
752	DYN CHECK: NO MAXIMUM DETECTED
753	DYN CHECK: CALCULATE VALUE
754	DYN CHECK: PEAK TOO SHORT
755	DYN CHECK: PEAK TOO LONG

**System warning code Description**

756	DYN CHECK: CALC. DERIVATIVE
757	DYN CHECK: NO PEAK PLATEAU
758	DYN CHECK: NO FILTER CALCULATION
759	DYN CHECK: SCHEDULING CALCULATION
760	DYN CHECK: WEIGHT BELOW MINIMUM
761	DYN CHECK: SPEED OUTSIDE RANGE
762	DYN CHECK: WEIGHT ABOVE MAXIMUM
763	DYN CHECK: ADM READ ERROR
764	DYN CHECK: OBJECT IGNORED
765	DYN CHECK: PLATEAU DETECTION INCORRECT
766	DYN CHECK: CALCULATION SCHEDULING ERROR
767	DYN CHECK: ADM READ ERROR



# 5 Maintenance

5.1 Checkweigher Belt Tensioning Procedure .....	72
5.2 Battery Replacement Procedure .....	73
5.3 Introduction to the Maintenance Table .....	74

This section describes maintenance procedures for the machine. Since the following information has a direct impact on the safety of workers, take the time to read it carefully.

It is the owner's responsibility to maintain the equipment in good working order. Damaged parts must be replaced as soon as possible. Any further damages on the equipment, the product or worker due to not replacing these parts are the owner's responsibility.

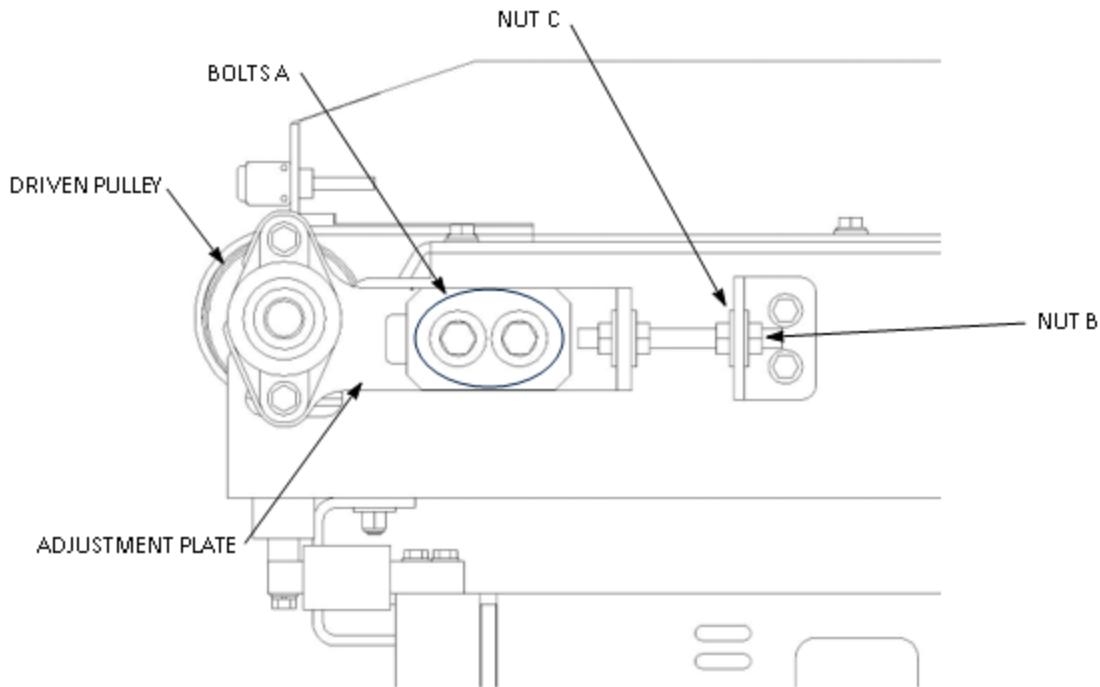
**WARNING**


**Make oil changes only when the surface of the reducer is warm. Cold oil does not flow well and hot oil can cause burns.**

## 5.1 Checkweigher Belt Tensioning Procedure

Proceed as follow to install the checkweigher belt and maintain the required tension:

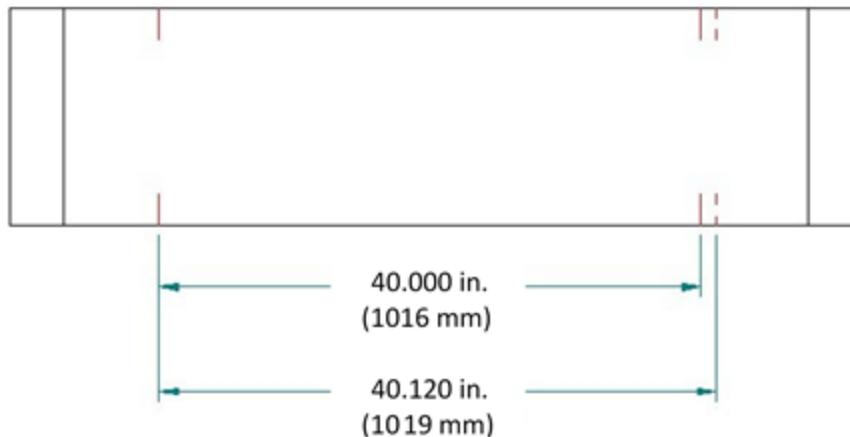
1. Slightly unscrew the 2 bolts **A** holding the adjustment plate (See [Figure 5-1](#)). Do not unscrew more than half a turn in order to maintain proper positioning of the plate.



**Figure 5-1 Adjustment bolts and nuts**

2. Loosen nut **B** to unlock nut **C**.

3. On each side of the belt, draw two marks perpendicular to the belt (see [Figure 5-2](#)).



**Figure 5-2 Conveyor belt tensioning**

4. Using the driven pulley, tension each side of the belt for about 0.3 % of the distance between the two marks. Add or remove tension to the belt by turning nut **C**. For example, if the distance between both marks is 40 in. (1016 mm), the belt elongation will be  $(40 \times 0.3) / 100 = 0.12$  in. ( $1016 \times 0.3 / 100 = 3$  mm).
5. Tighten bolts **A**.
6. Start the conveyor and check the belt alignment. If the belt is not properly aligned, repeat steps 1 to 5 using a higher tensioning factor without exceeding 0.75 %.
7. Once the adjustment completed, screw nut **B**.

## 5.2 Battery Replacement Procedure

### TO REPLACE THE BATTERY

**CAUTION**



To avoid program loss, the controller backup battery should be replaced every year. DO NOT turn the main power off when replacing the battery.

1. Disconnect all power to the instrument, unplug line cord.
2. Open the housing and locate the mainboard.
3. Use a small screwdriver or other suitable tool and carefully remove the bracket from the battery holder.

4. Carefully remove the old battery from the holder and insert the ***new one within 30 sec.***



Observe correct polarity, otherwise the entered data will not be stored!

5. Put the bracket of the battery holder back in place.
6. Close housing and power the instrument up. Display of weighing terminal shows power up message. The unit is operational again.

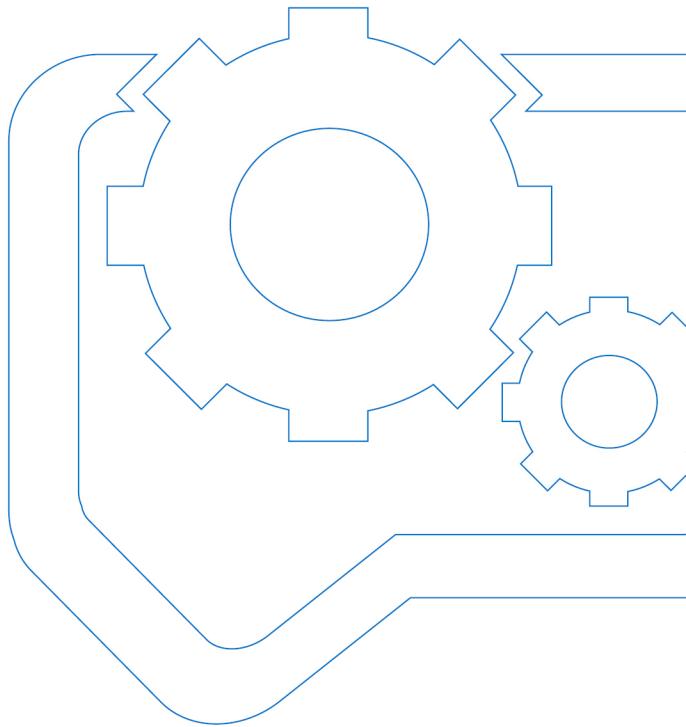


Observe all applicable regulations for the disposal of used batteries!

### 5.3 Introduction to the Maintenance Table

The following table indicates the preventive maintenance required for each module of the equipment. The frequency of maintenance corresponds to a production schedule of 8 hours a day, 7 days a week and can be adapted to real production hours, mechanical problems encountered, environment, etc. A checklist for the maintenance personnel can also be drawn up using this information.

Inspect all equipment parts to make sure everything is in good working order. Check any sound or vibration that seems suspect. Immediately correct any abnormal situation.



## 6 Appendices

## Printing and Reporting

### A Printing/Reporting Availabilities vs Port Selection

The SpeedAC iQ Controller allows the operator to perform various data printing/reporting based on port selection (Com 2, USB or Ethernet) in the **Machine Configuration** page 2.

The following options are available for printing/reporting data depending on the operator choice:

- Continuous Output (configuration required in Controller Service Mode as per Systec User Manual). The operator must select the format and either the Ethernet Port (Eth) or SIM2 (Com2) to carry out data. No other printing option is selectable once configured on the port.
- Unit Record String (for data trending in PC or PLC).
- Unit Record Files which is an extension of Unit Record String in a file.
- Report to Printer (for screen content hard copy).

The [Table 1-1](#) summarizes all these options for a best understanding to make a wise choice.

	Ethernet		USB		Com 2	
Continuous Output	✓	Must be configured in Service Mode	✗	N/A	✓	Must be configured in Service Mode
Unit Record String	✓	Always available	✓	For Data Trending in PC or PLC	✓	For Data Trending in PC or PLC
Unit Record File	✗	N/A	✓	Stored 3 days (SHARED)	✗	N/A
Report to Printer	✓	Screen content hard copy	✓	Screen content hard copy	✓	Screen content hard copy
	✓	Available	✗	Not Applicable (N/A)		

**Table 1-1 Available printing/reporting options vs port selection**

[Figure 1-1](#) to [Figure 1-3](#) are depicting the content of the drop-down lists for each type of selected ports. Content will be discussed later in this document.



**Figure 1-1 Com 2 drop down list printing/reporting options**



**Figure 1-2 USB drop down list printing/reporting options**



**Figure 1-3 Ethernet drop down list printing/reporting options**

## B Continuous Output

The **Continuous Output** (live weight) must be configured in the Controller Service Mode either on the Ethernet (Eth) IP or Com 2 (SIM2) ports. The selected port will be used only to

carry on data and no other printing/reporting options can be selected after the configuration is completed.

The configuration includes the choice of the type of format to which data will be formatted.



Com2 is assigned to SIM2

Please refer to the Systec IT8000ET User Manual and read the following sections for further details:

- Entry of Parameters (General) – Tree view navigation on Service Mode
- Continuous Output (Cont. out) – Interface Protocols Setup
- Connection of Serial Interfaces (SIM And DUAL-ISM) – Wiring of Serial Interfaces

## C Unit Record String

### C.1 Available Ports

As described previously, the Unit Record String is used to perform data trending via a PC or PLC. This option is available via USB, Com 2 and Ethernet Ports. For Ethernet access, data is always available, without any iQ configuration, at SpeedAC iQ IP address - port 2500.

### C.2 String Definition

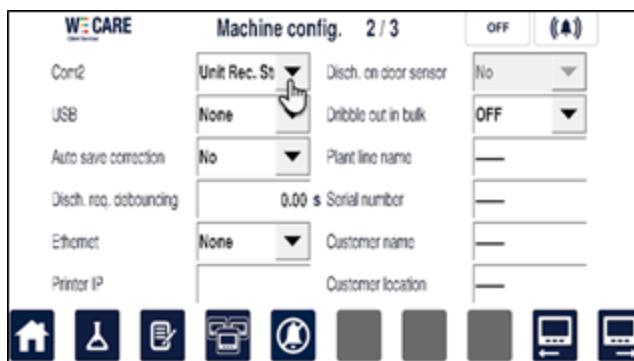
Weighing Data are specifically formatted in a string of 13 different fields separated with a semicolon (;) with tags character CR and LF to its end for Carriage Return and Line Feed respectively.

1	2	3	4	5	6	7	8	9	10	11	12
< ; 000 000 001 ; 25.00 ; kg ; 0.12 ; 25.05 ; +A ; 25.02 ; 33 ; 161631 ; 20180925 ; > <b>CRLF</b>											

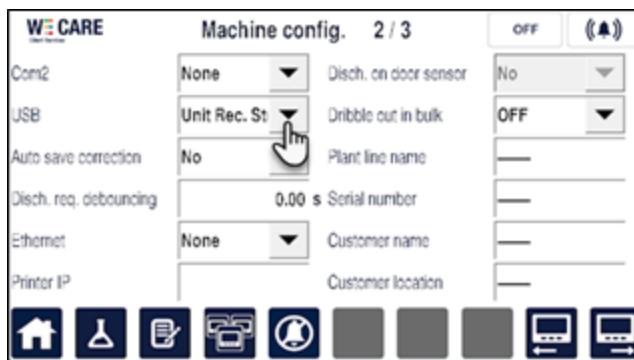
- Field 1: Start character ‘<’
- Field 2: Serial Number of up to 12 alphanumeric digits set in **Machine Configuration**
- Field 3: Target Weight Value of up to 3.2 digits (xxx.yy)
- Field 4: Unit of Weightment ‘kg’ or ‘lb’
- Field 5: Tare Weight value of up to 1.2 digits (x.yy)
- Field 6: Checked Net Weight Value up to 3.2 digits (xxx.yy)

- Field 7: Checked Weight Status
  - ‘-R’ Underweight reject
  - ‘-A’ Underweight accept
  - ‘==’ Accepted unit
  - ‘+A’ Overweight accept
  - ‘+R’ Overweight reject
  - ‘!!’ Invalid Weighment
- Field 8: Weigh Program Setpoint corresponding to Checked Weight Status
  - Nominal Weight for Accepted unit
  - 0.00 for Invalid Weighment
- Field 9: Units Done as per Production Report page, can be reset in this page (up to 6 digits)
 

\*If Batch is used, this number will represent the actual Batch count (See Batch page for more details)
- Field 10: Time of Weighment (6 digits) HHMMSS
- Field 11: Date of Weighment (8 digits) YYYYMMDD
- Field 12: End Character ‘>’
- Carriage return end line feed characters are sent at the end of the string
- [Figure 1-4](#) and [Figure 1-5](#) show the way to select **Unit Record String Data** option from the drop-down list on Com 2 and USB fields respectively.



**Figure 1-4 Unit record string on com2 port**

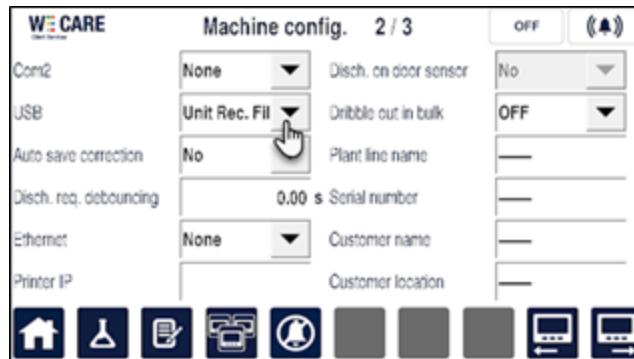


**Figure 1-5 Unit record string on USB port**

## D Unit Record File

The SpeedAC iQ Controller can store weighing data (Unit Record String) in a file, in the controller Shared folder memory (for 3 days) and in USB Shared folder (for 7 days maximum). Storage in controller shared memory is made without any iQ configuration (not optional).

First, the Unit Record File that may be available on USB memory device must be selected from the drop-down list as shown in [Figure 1-6](#).



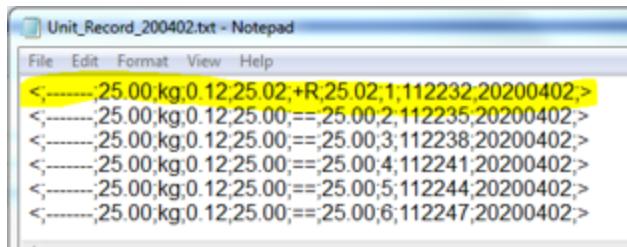
**Figure 1-6 Unit record file on USB**

### D.1 Weighing Data Location

- A FAT32 USB Memory device must be plugged in to the SpeedAC iQ USB port to collect data.
- USB device must have a folder named “DataLog” created at the root of the device for weighing data to be stored.
- A 7 files log will be kept in this folder, each day using one file. If there are more than 7 files, the oldest will be deleted for space purpose.

- **File name** will be created as follow: **Unit\_Record\_YYMMDD.txt**
  - YY last 2 digits of the year set in SpeedAC iQ.
  - MM current month set in SpeedAC iQ.
  - DD current day set in SpeedAC iQ.

A 25.02 kg overweight reject(+R) was recorded at 11H22M32S in file Unit\_Record\_200402.txt and illustrated in [Figure 1-7](#).



```
<-----;25.00;kg;0.12;25.02;+R;25.02;1;112232;20200402;----->
<-----;25.00;kg;0.12;25.00;==;25.00;2;112235;20200402;----->
<-----;25.00;kg;0.12;25.00;==;25.00;3;112238;20200402;----->
<-----;25.00;kg;0.12;25.00;==;25.00;4;112241;20200402;----->
<-----;25.00;kg;0.12;25.00;==;25.00;5;112244;20200402;----->
<-----;25.00;kg;0.12;25.00;==;25.00;6;112247;20200402;----->
```

**Figure 1-7 Sample of Unit Record String Data File**

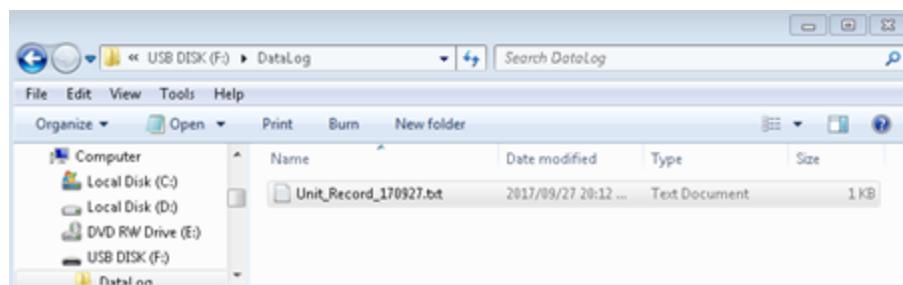
Once this selection of **Unit Record File** option is done, the weighing data are then accessible per 2 different ways:

## D.2 Accessing Weighing Data via USB Stick

The operator must stop the weighing equipment to avoid losing data.

- Stop cycle
- Remove USB device from SpeedAC iQ
- Plug it into a computer and copy the file(s)
- Put USB device back in controller and Restart system

[Figure 1-8](#) shows the **Unit\_Record\_YYMMDD.txt** file in the USB stick in the DataLog folder (that was described previously).



**Figure 1-8 USB Unit\_Record\_YYMMDD.txt file location on DataLog folder**

Figure 1-9 shows the content of the **Unit\_Record\_YYMMDD.txt** with a record of 10 dumps performed.

```
<-----25.00;kg;0.12;25.00;==;25.00;1;111806;20200402;>
<-----25.00;kg;0.12;25.00;==;25.00;2;111809;20200402;>
<-----25.00;kg;0.12;25.00;==;25.00;3;111812;20200402;>
<-----25.00;kg;0.12;25.00;==;25.00;4;111815;20200402;>
<-----25.00;kg;0.12;25.00;==;25.00;5;111818;20200402;>
<-----25.00;kg;0.12;25.00;==;25.00;6;111821;20200402;>
<-----25.00;kg;0.12;25.00;==;25.00;7;111824;20200402;>
<-----25.00;kg;0.12;24.99;==;25.00;8;111828;20200402;>
<-----25.00;kg;0.12;25.00;==;25.00;9;111831;20200402;>
<-----25.00;kg;0.12;25.01;==;25.00;10;111834;20200402;>
```

Figure 1-9 Reading of Unit\_Record\_YYMMDD.txt file from USB stick

### D.3 Accessing Weighing Data via FTP



This procedure does not require the stopping of equipment.

- Located controller Ethernet TCP/IP address (xxx.xxx.xxx.xxx)
- Use any FTP client tool or any web browser (<ftp://xxx.xxx.xxx.xxx>)

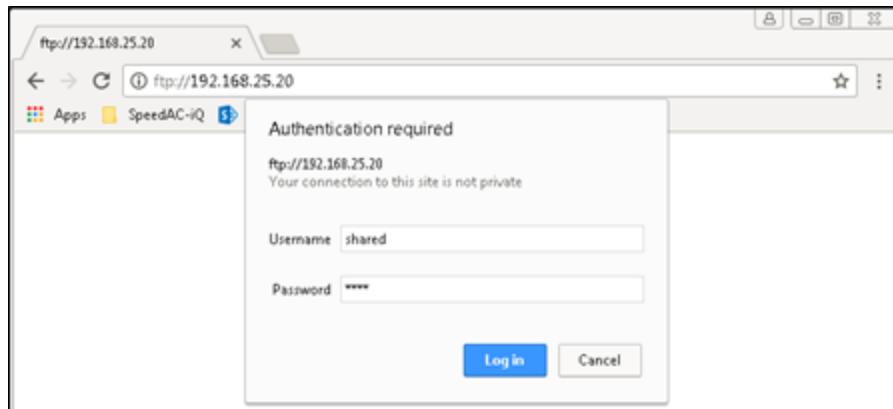
#### D.3.1 Accessing SHARED Folder

To access the Shared folder on the SpeedAC iQ Controller via FTP Tool or from any web browser you must login with the following credentials:

Username: **shared**

Password: **2234** (Set in Service Mode - "Network" menu)

Please refer to [Figure 1-10](#) to [Figure 1-12](#) for more details of data collected and its content as well.



**Figure 1-10** FTP authentication on SpeedAC iQ controller on Shared Folder



**Figure 1-11** Unit record file access on Shared Folder



**Figure 1-12** Unit record file content on Shared Folder

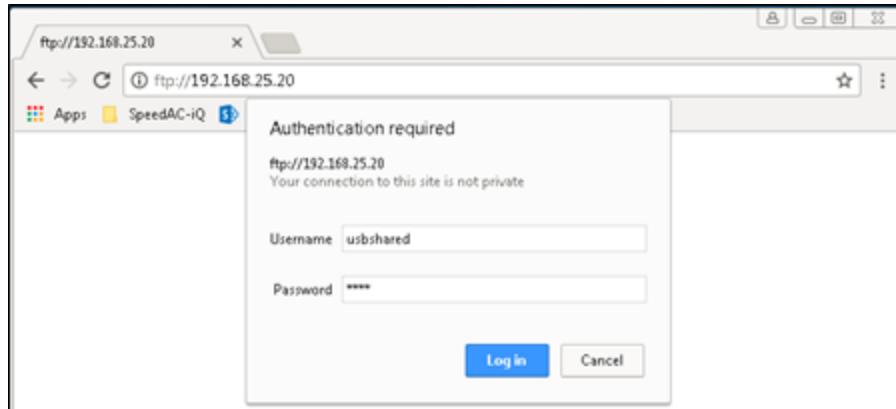
### D.3.2 Accessing USBSHARED Folder

In the same manner, USB Shared Folder is accessible using the following credentials:

Username: **usbshared**

Password: **2234** (set in Service Mode - "Network" menu)

Please refer to [Figure 1-13](#) to [Figure 1-15](#) for more details on the content resulting from exploring the content of the DataLog folder from the FTP remote access.



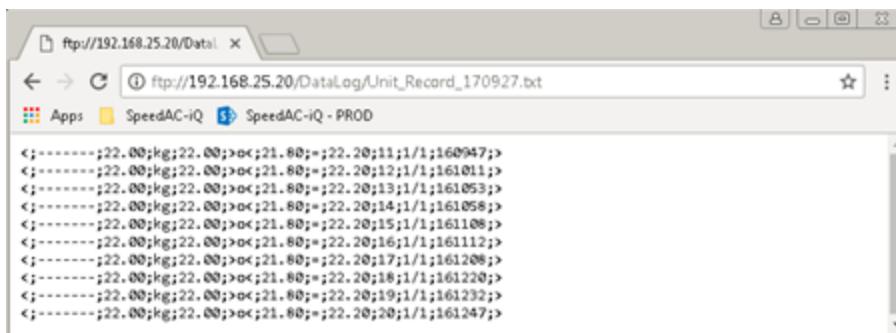
**Figure 1-13** FTP authentication on SpeedAC iQ Controller on USB shared folder

Figure 1-14 displays the Unit\_Record\_YYMMDD.txt file stored in the DataLog folder. Usually, the size of this file is bigger than the one in the Unit Record String option due to the number of weighments performed.



**Figure 1-14** FTP Unit\_Record\_YYMMDD.txt file location on DataLog folder

In the example in Figure 1-15, the content of the text file indicates 10 weighments for Sep. 27th 2017.



**Figure 1-15** Reading of Unit\_Record\_YYMMDD.txt file from FTP access

## E Report to Printer

Independently from hard prints (on real printer), reports will be printed to USB files or sent as regular ASCII over Ethernet port without any special configuration.

USB: if a USB key is plugged into the port, a report will be generated, at the root of the key. It will either be "PrintReport.txt" for the standard report and "PrintBatch.txt" for the batch report. Any time the print function will be triggered, the new report will be written at the end of the file, allowing the file to keep the history of the reports. The files can be accessed via FTP or manually.

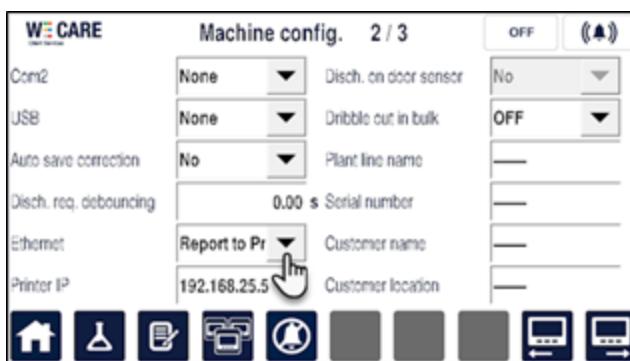
Ethernet: Every time the print function is triggered, the associated report page will be sent as a regular ASCII string over Ethernet on port number 9101. The report can be collected via a PC application that will listen to the controller IP address, at the port number mention above.

The **Report to Printer** option is available for all selected ports to print out report screens content on hard copy. We are going to describe how to select these ports and eventually additional features required to make it work.

### E.1 Over Ethernet IP Port

Over the Ethernet IP Port, the operator should ensure that the IT Department already provided an IP address to the Network Printer in the same range as for the SpeedAC iQ controller. The SpeedAC iQ Controller IP address is 192.168.25.20 in this example.

Now, switch to the controller **Machine Configuration** page 2 of 3 and select **Report to Printer** from the drop-down list in the **Ethernet** field as it is described on [Figure 1-16](#) below (go to section [E.4](#) and [E.5](#) to access the Report Page details).



**Figure 1-16 Report to printer selection over ethernet IP**

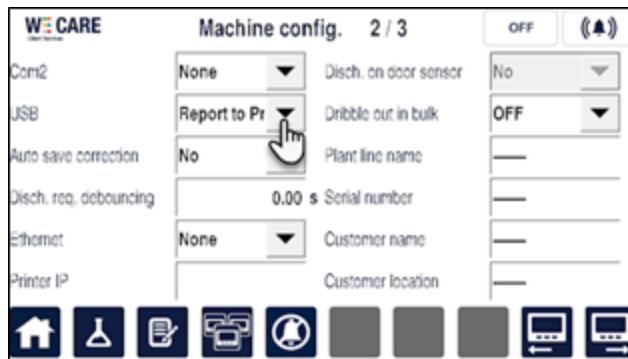


**Figure 1-17 Printer IP Setup**

Then, enter the IP Address in the Printer IP field (e.g.: 192.168.25.5) as described in [Figure 1-17](#).

## E.2 Over USB Port

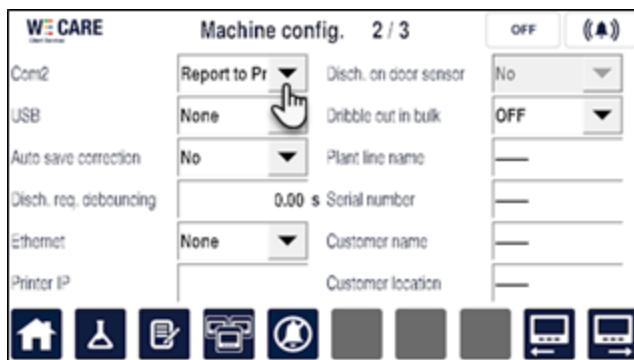
Select **Report to Print** from the drop-down list on the USB field as shown in [Figure 1-18](#) (go to sections [E.4](#) and [E.5](#) to access the Report Page details)



**Figure 1-18 Report to printer selection over USB**

## E.3 Over Com2 Port

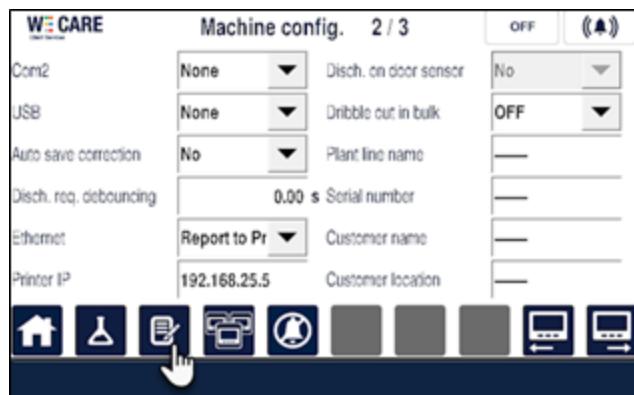
Select **Report to Print** from the drop-down list on the **Com2** field as shown in [Figure 1-19](#) (go to sections [E.4](#) and [E.5](#) to access the Report Page details).



**Figure 1-19 Report to printer selection over Com2**

#### **E.4 Accessing Production Report Page Printing**

This part applies to any type of port selected in section 5.1 to 5.3.



**Figure 1-20 Report page access**

Click on the **Report** key as described [Figure 1-20](#) above to access the **Production Report** page.

Then, click on the **Printer** key to print the Production Report as shown in [Figure 1-21](#).



**Figure 1-21 Production report raw screen**

The result should look like the one in [Table 1-2](#) on the paper sheet.

PrintReport.bd					
1 Production report					02/03/2020
					22:40
2 SINCE RESET SINCE RESET					
3 Nominal weight 25.00 kg					0 0.0%
4 Units done 57					Underweight accept 4 7.0%
5 Total weight 1425.00 kg					Units accepted 50 87.7%
6 CUMULATED PRODUCTION					Overweight accept 2 3.5%
7 Total units 947					Overweight reject 1 1.8%
8 Total weight 23674.83 kg					Invalid weighments 0 0.0%
9					
10					
11					

**Table 1-2 Production report screen hard copy**

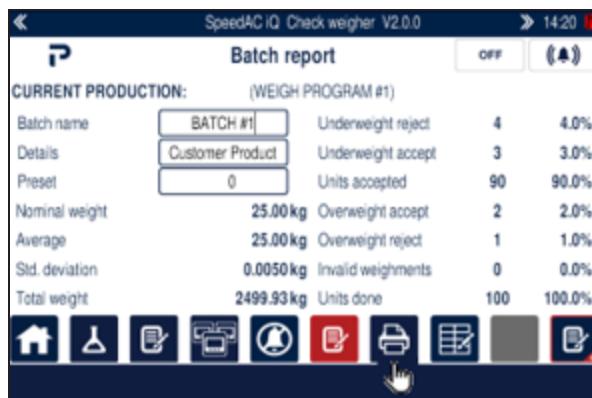
## E.5 Accessing the Batch Report Page Printing

Click on the red Report key to switch to the Batch Report page (refer to [Figure 1-22](#)).



**Figure 1-22 Batch report page access**

Then, click on the Printer key on [Figure 1-23](#) to print the Batch Report sample.



**Figure 1-23 Batch report raw screen**

The result of the printing trial should look like the one described on Table 1-3 below on the sheet paper.

PrintBatch.txt					
1	Batch report	WP:WEIGH PROGRAM #1			
2					
3	Batch name	BATCH #1			
4	Details	CUSTOMER PRODUCT			
5	Preset	100	Underweight reject	4	4.0%
6	Units done	100	Underweight accept	3	3.0%
7	Nominal weight	25.00	kg	Units accepted	90
8	Average	25.00	kg	Overweight accept	2
9	Std. deviation	0.0050	kg	Overweight reject	1
10	Total weight	2499.93	kg	Invalid weighments	0
11					
12					

**Table 1-3 Batch report screen hard copy**

## Fieldbus Communication

### A Fieldbus Communication with PLC

#### A.1 Overview

The SpeedAC iQ Controller allows communication with PLC thru 4 fieldbus protocols:

- Profibus DP (Internal Profibus module PBU/PBX)\*
- Modbus TCP (via built-in Ethernet port)
- PROFINET (Internal PROFINET module PNU/PNX)\*
- ETHERNET (Internal ETHERNET-IP module ETX)\*

Please refer to IT8000ET Systec User manual for further details on the fieldbus plug-in module.

### B Ethernet/IP Configuration

Prerequisites are necessary to configure the SpeedAC iQ controller communication with the PLC (CompactLogix L33ERM from Rockwell Automation in our example).

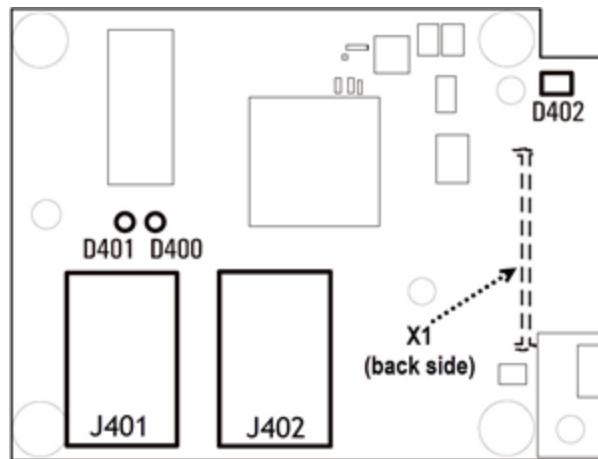
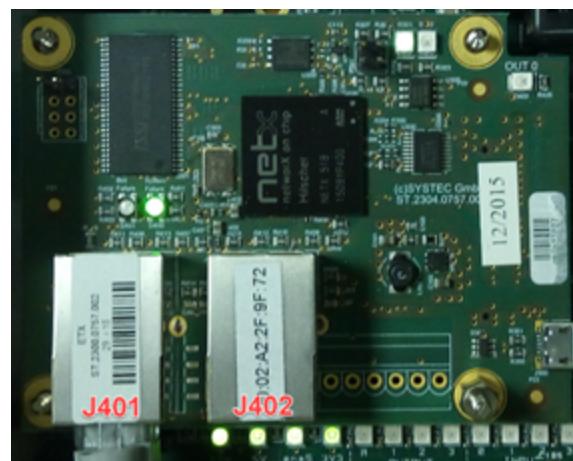
Set the IP Address of your PC in the same range as for your PLC one:

- PLC: 172.19.48.73 (for instance)
- PC: 172.19.48.50 (for instance)

#### B.1 Connection and Setup of Ethernet/IP Module ETX

This section describes how to configure the ETX Module to fully communicate with the PLC. We will need to access the Service Mode on the SpeedAC iQ controller to change the Fieldbus Communication Settings as well. Please follow the steps below.

- Make sure that you have connected the right Ethernet/IP-Module ETX card on the SpeedAC iQ mainboard as per [Figure 1-1](#).



**Figure 1-1 ETG sockets for Ethernet/IP communication**

- Connect a RJ45 cable on J401 socket (J401 and J402 are equivalents) to your PLC and another RJ45 from your PC to the Ethernet communication switch of the PLC.
- Use the **Admin** password to switch to the **Service mode** screen on the SpeedAC iQ Controller ([Figure 1-2](#)).



Figure 1-2 SpeedAC iQ admin password validation screen

- Use the right-hand side arrow key to locate **Service Config** and validate by hitting the blue return button ([Figure 1-3](#)).



Figure 1-3 Service mode configuration screen access

- Locate the **Fieldbus** option and validate as per [Figure 1-4](#).



**Figure 1-4 Fieldbus configuration screen access**

- Locate the **ETHERNET IP** option and validate as per [Figure 1-5](#).



**Figure 1-5 Ethernet IP selection and validation screen**

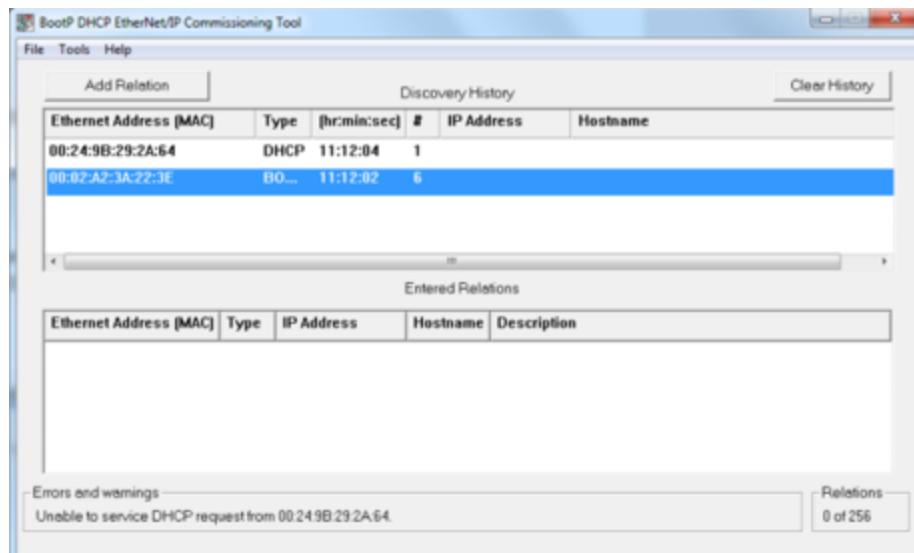
### B.1.1 Setting ETX Module IP address with BOOTP-DHCP Eth/IP tool



This procedure is faster if SpeedAC iQ program is not loaded yet.

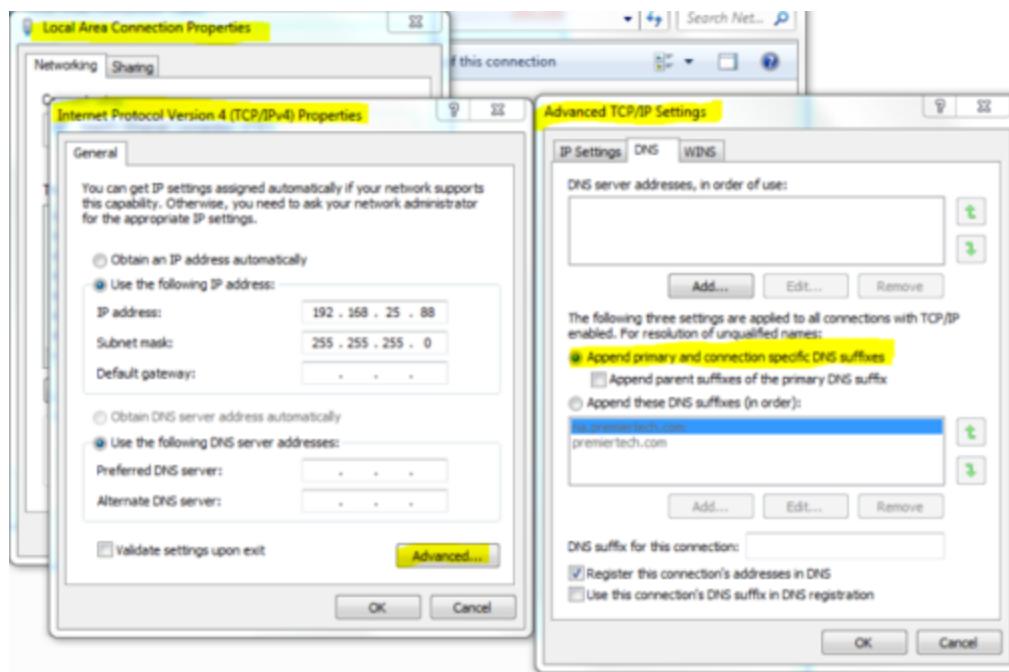
**⚠️ Never used Ethernet Device Configuration tool (Hilscher), as suggested in Manual, to set ETX IP Address – setting module to “Static” addressing will then be impossible.**

- Make sure you have the version 3.02 of BootP-DHCP (or greater).
- Turn OFF the Wi-Fi and disconnect any other Ethernet devices from your computer.
- Connect only the ETX card to your computer.
- Start the BootP/DHCP Ethernet/IP tool and select the network adapter uses to interconnect the ETX to your computer.
- The ETX - MAC address should appear after 1 or 2 minutes as shown in the image below: (If it does not appear after 3 minutes, perform a power cycle on controller (switch to OFF then ON)).



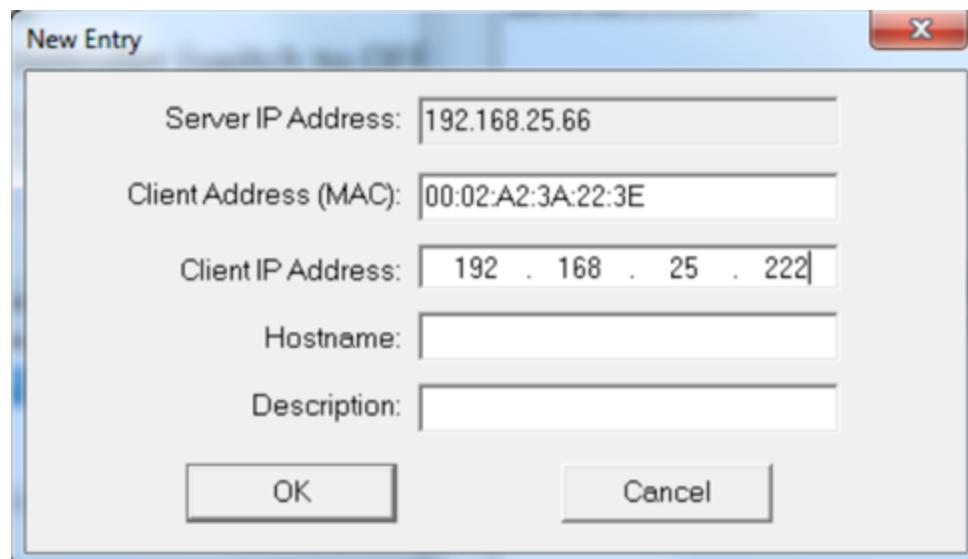
**Figure 1-6 BootP/DHCP Ethernet/IP tool Screen**

- If you don't see it, you might have to change your Network Adapter Setting as follow: (a computer restart with NO cable connected to the Ethernet port may be required to be able to change this setting).



**Figure 1-7 Network Adapter Settings Screen**

- When the ETX mac address appears in the **Discovery History**, select it and click **Add Relation**.



**Figure 1-8 IP Settings Screen**

- Set the desired (specified by customer) IP address for the ETX module and click **OK**.

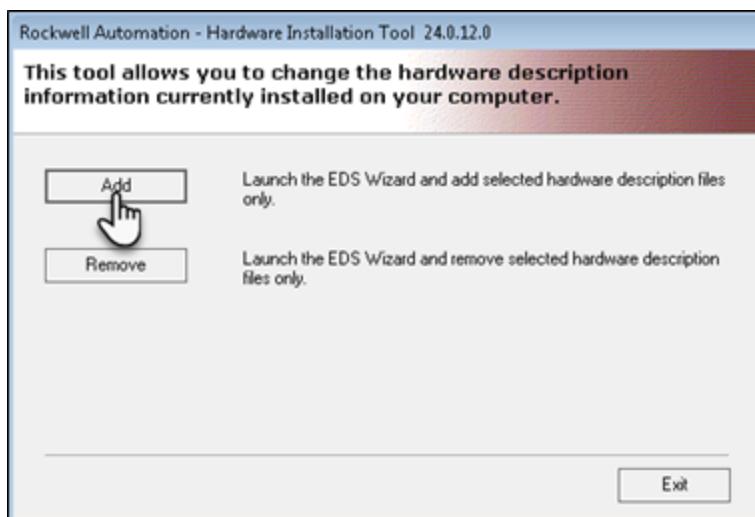
- At this point, the IP address is set but is not Static. A power OFF will cause the ETX module to lose its IP address.

## B.2 Configuring the PLC using Rockwell Software

This part describes all the prerequisites for configuring the PLC communication with the SpeedAC iQ Controller.

### B.2.1 EDS File Setup

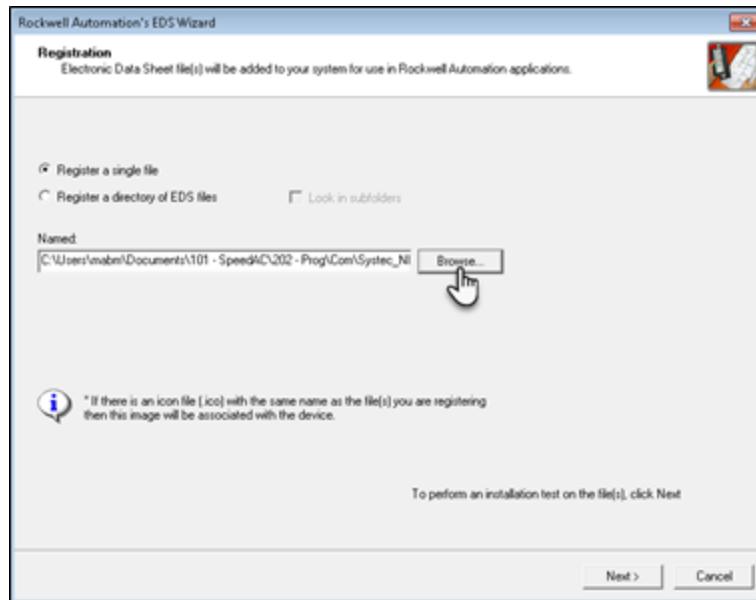
The Electronic Data Sheet (EDS) file Systec NETX 51-RE EIS V1.1.EDS can be downloaded from the Software library under: EDS - ETHERNET IP.zip.



**Figure 1-9 EDS hardware installation tool main screen**

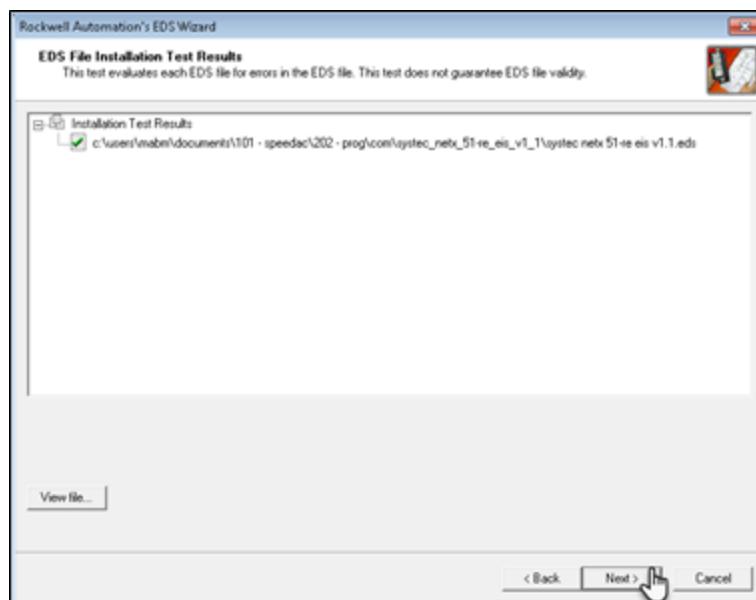
- Run the EDS Installation Tool from the RSLinx Tools folder using the following path:  
*Start Menu → All Programs → Rockwell Software → RSLinx → Tools*
- Click on **Add** to bring up the **Registration** window (see [Figure 1-9](#)).

- Browse the location of the EDS file on your computer ([Figure 1-10](#)).



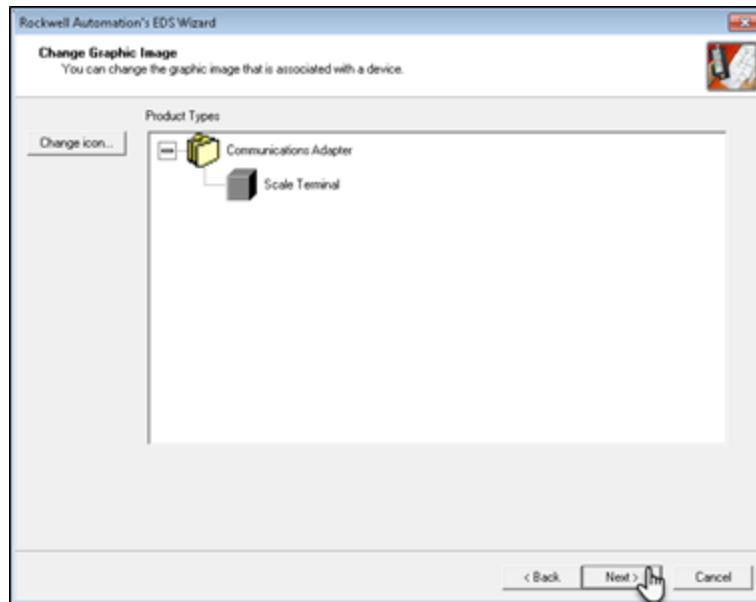
**Figure 1-10 EDS file browsing location**

- Continue the setup by clicking the **Next** button on the next screen and make sure that there is a green check mark on the box the EDS file as per [Figure 1-11](#).



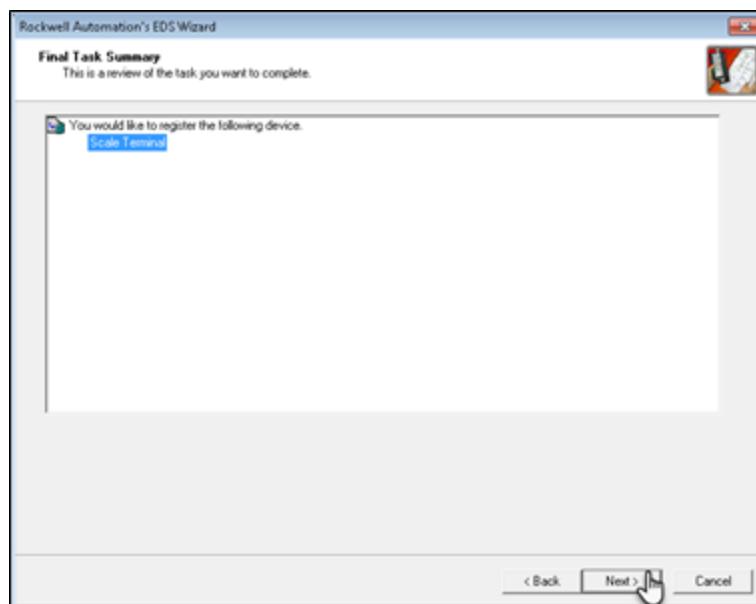
**Figure 1-11 EDS file test results screen**

- Click on next again unless you need to change the graphic image associated with the device (see [Figure 1-12](#))



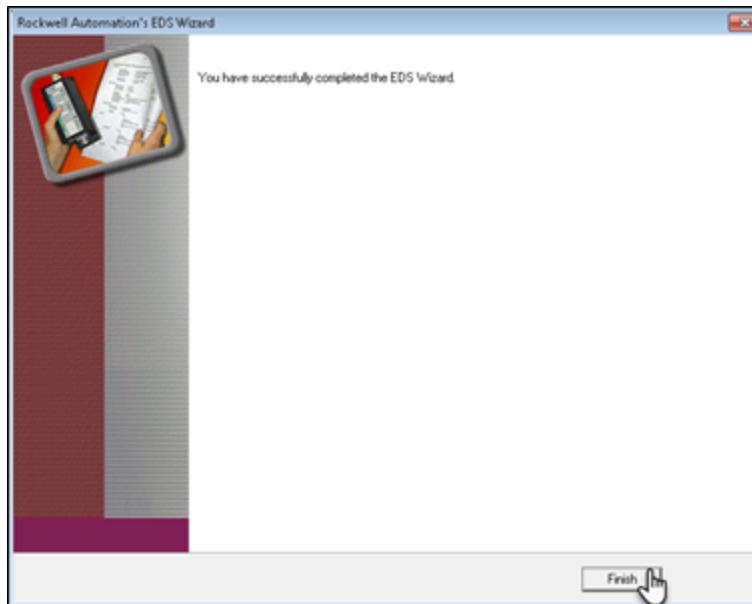
**Figure 1-12 EDS file device image change screen**

- Click on Next again to register your device as per [Figure 1-13](#) below.



**Figure 1-13 EDS file device registration screen**

- Click on Finish button to complete this setup.



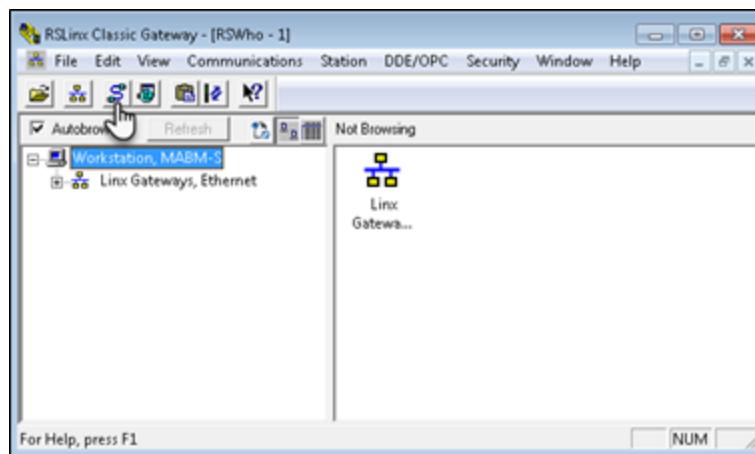
**Figure 1-14 EDS file setup complete**

### B.2.2 RSLinx Configuration Drivers

Open RSLinx Classic on your desktop and locate the Configure Drivers either by using the path from the navigation bar:

*Communications → Configure Drivers*

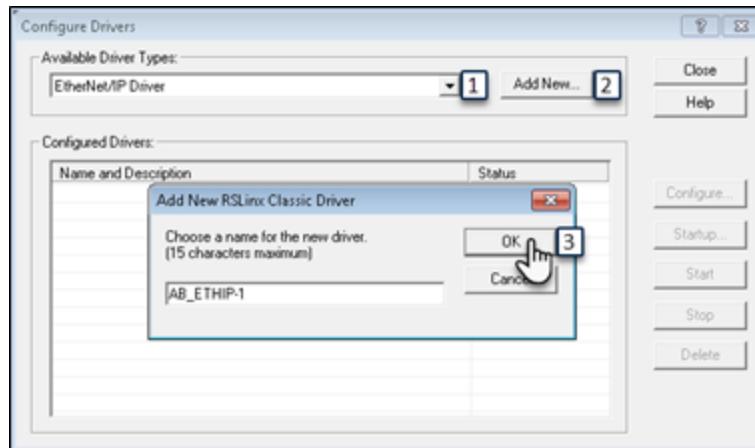
Or by clicking on the **Configure Drivers** icon as per [Figure 1-15](#) below.



**Figure 1-15 Configure drivers access screen**

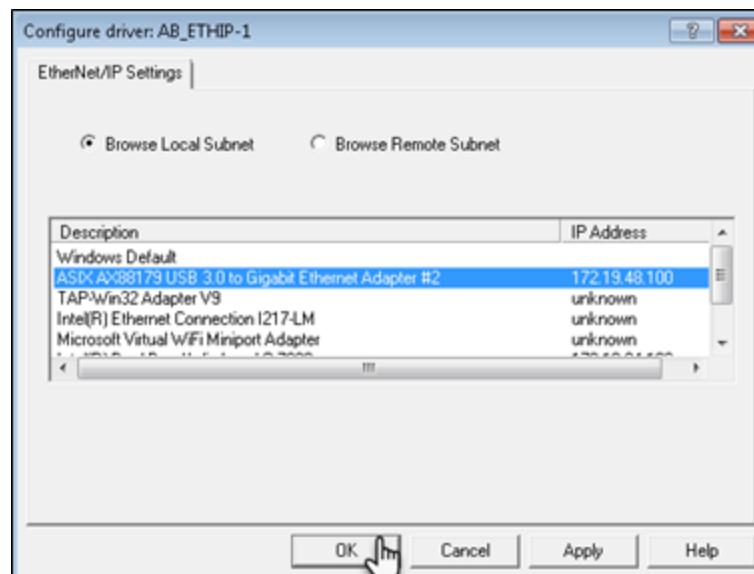
Then, apply the following steps:

- [1] Click on the arrow and select **Ethernet/IP Driver** from the drop-down list.
- [2] Click on the **Add New** button to add the new driver to the **Configured Drivers** list.
- [3] Click on the **OK** button to validate the default driver name or enter a name of your choice.



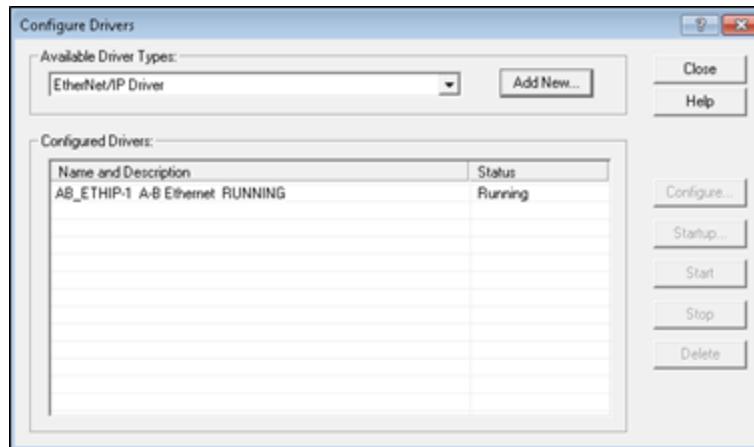
**Figure 1-16 Driver configuration and validation screen**

- Select your computer network card as per [Figure 1-17](#).



**Figure 1-17 Network card selection**

- Figure 1-18 shows the new driver status as **Running** in **Configured Drivers** list view.



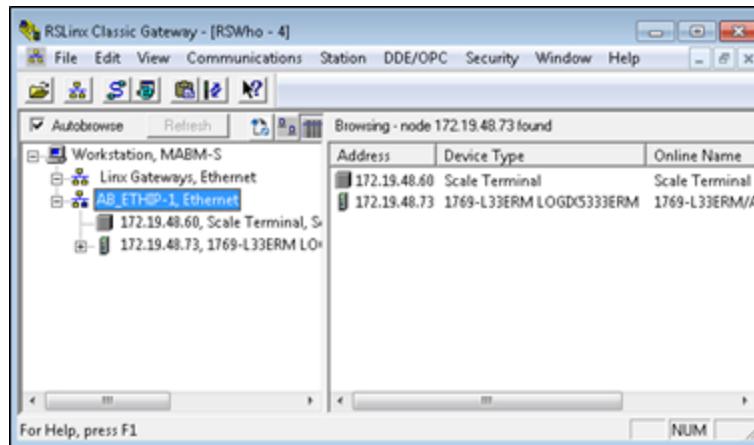
**Figure 1-18 Configured drivers list view**

- Check which devices are now accessible via the network bridge either by using the following path from the navigation bar:

*Communications → RSWho*

Or

- Click on **RSWho** icon as per Figure 1-19.
- Now, we have access to the Scale terminal and PLC whose IP Address are 172.19.48.60 and 172.19.48.73 respectively (see Figure 1-19).



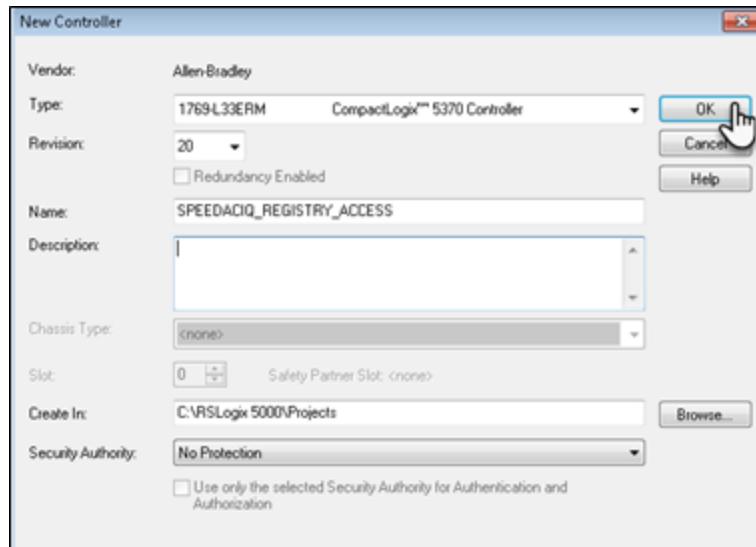
**Figure 1-19 Scale terminal visibility**

### B.3 Accessing Scale Terminal Data

This part describes in few steps how to access SpeedAC iQ data from the PLC.

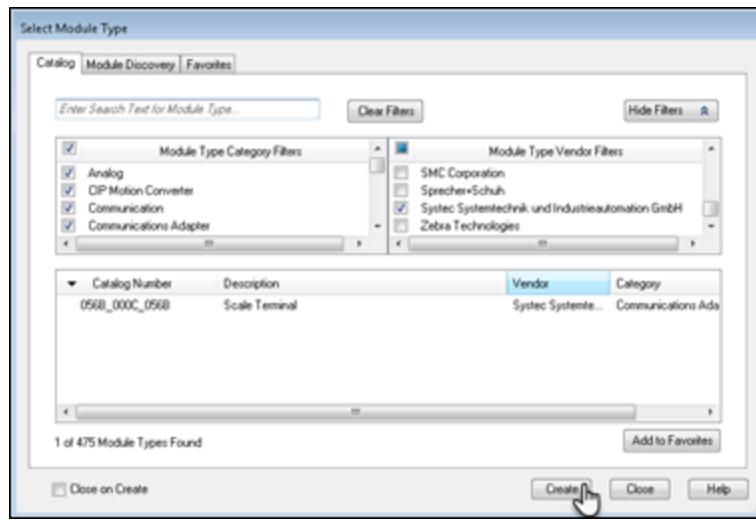
### B.3.1 Preliminary Steps

- Open RSLogix and create a new program (e.g: SPEEDACIQ\_REGISTRY\_ACCESS as per [Figure 1-20](#) below).



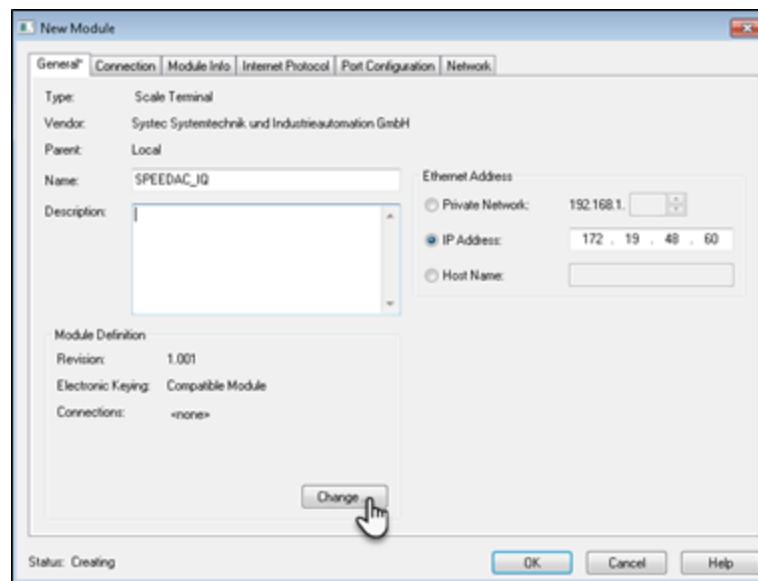
**Figure 1-20 New program creation window**

- Add a new Ethernet Module and put a check mark in the field tagged Systec ... GmbH, hit the **Create** button to complete this step (see [Figure 1-21](#)).



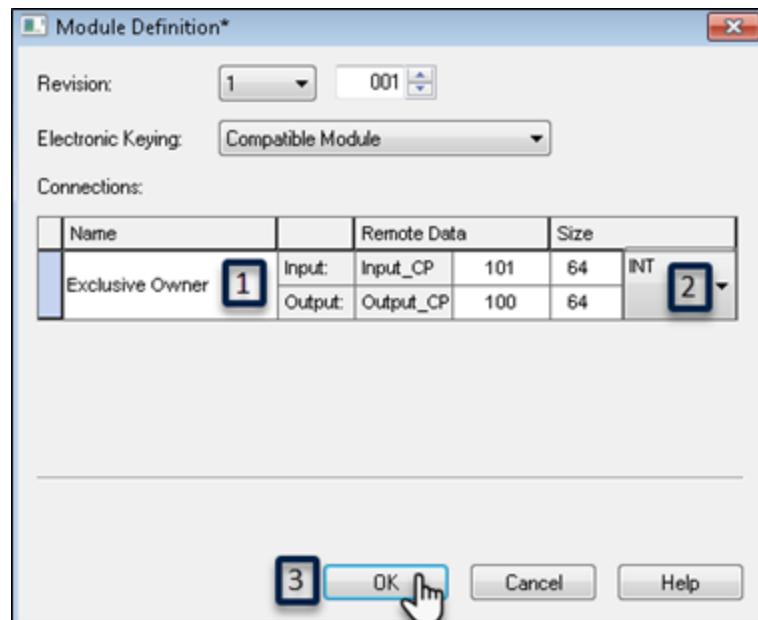
**Figure 1-21 Ethernet module choice window**

- Give a name to your new module and set its IP address as well. Please refer to section [B.2.2](#) for further details (see [Figure 1-22](#)).



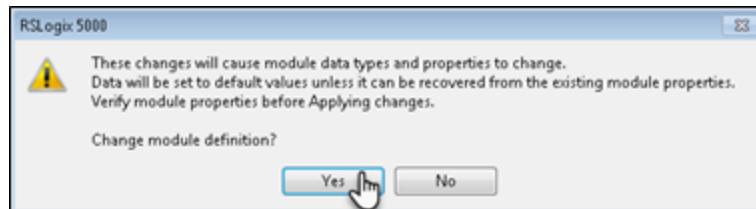
**Figure 1-22 Network parameter module window**

- Then click on **Change** button to set a connection type as per [Figure 1-23](#).
- [1] Select **Exclusive Owner** from the drop-down list.
- [2] Select the Size of your data as an INT.
- [3] Click on **OK** to continue.



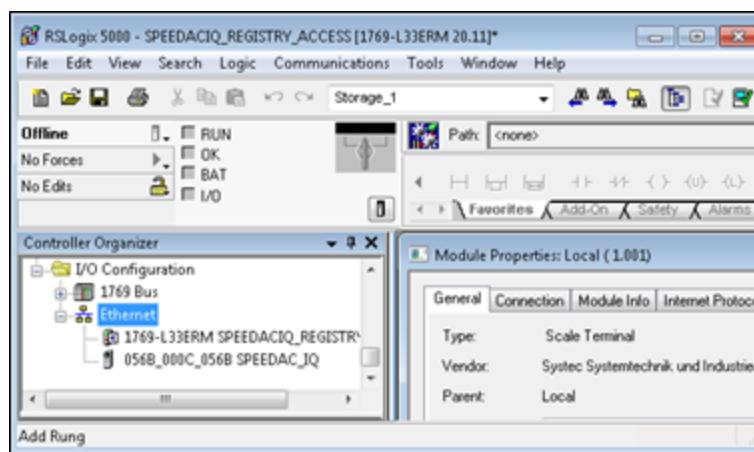
**Figure 1-23 Module definition window**

- Click on **Yes** to apply changes to the module (see [Figure 1-24](#)).



**Figure 1-24 Module definition validation window**

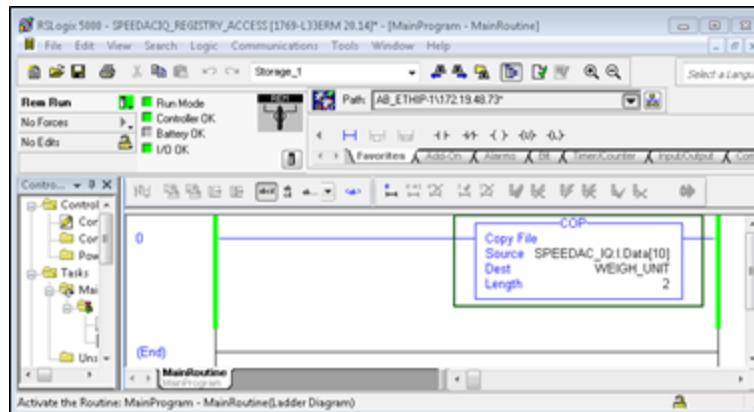
The SPEEDAC\_IQ module is now created and visible as per [Figure 1-25](#).



**Figure 1-25 New module setup complete**

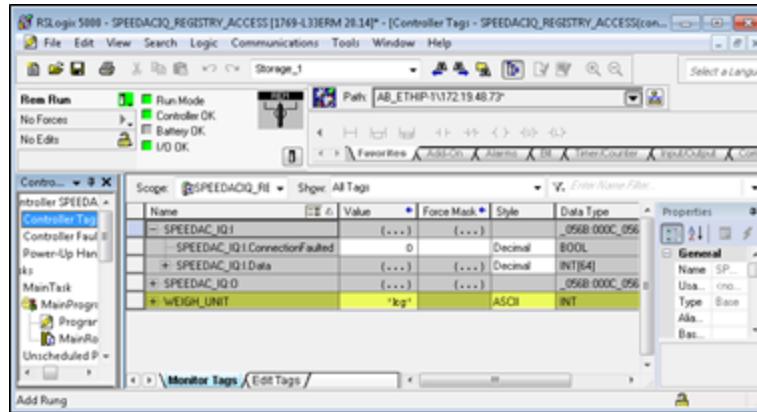
### B.3.2 Managing Data Words

Let's create a simple instruction to copy Weigh Unit data string from SPEEDAC\_IQ:I.Data[10] to a new variable WEIGH\_UNIT (see [Figure 1-26](#)).



**Figure 1-26 Routine for WEIGH\_UNIT data reading**

Now, we can download the program to the PLC and switch online to access these data from the **Controller Tags** list view as shown in [Figure 1-27](#).



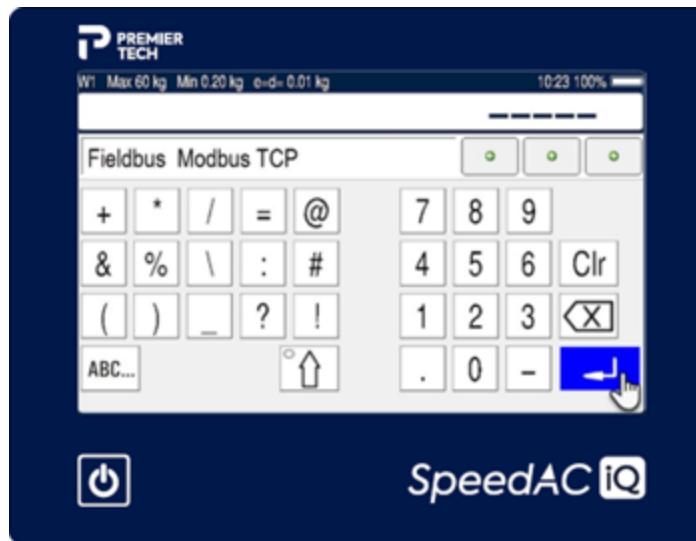
**Figure 1-27 Controller tags data reading**

## C Modbus TCP Configuration - Data Access via Ethernet Port

In this part, we are going to learn how to manipulate the SpeedAC iQ Data Words from the Fieldbus Modbus TCP.

### C.1 Preliminary Steps on SpeedAC iQ Controller

Please follow the steps described in section [B.1](#) for the Service Mode to establish the Modbus TCP connection with the PLC as per [Figure 1-28](#).



**Figure 1-28 Selecting Modbus TCP option**

- Exit the Service Mode using the up arrow in the middle. The SpeedAC iQ Controller will restart to apply changes.

## C.2 Accessing Data Words

Once the steps above have been successfully completed, we can now move on the second part to read or write data from the PLC on the SpeedAC iQ Controller as Server (Slave).

The following precautions must be carefully applied:

- Make sure to have the SpeedAC iQ Controller IP address set in the same range as per the PLC's (e.g: 192.168.25.x).
- Set the **Port** value to **502** (this port is automatically enabled when Modbus TCP is selected in Service Mode).
- Set **Slave ID** to **1**.
- Set the **Function Code** value to **3** (Read Data).
- Set your **First Register** to **0**.
- Set the **Number of Registers** to **64**.
- Set the **Register Size** to **16 Bits**.
- Set the **Minus Offset** to **0**.

[Figure 1-29](#) shows the first 10 registers accessed from PLC with their data content. The Live Weight on the sixth register is 22 kg.

Data Type	Register#	Bytes	Results	Comments
16bit INT	0	0258	600	Automatic Mode
16bit INT	1	0007	7	Ready to Discharge
16bit INT	2	0000	0	
16bit INT	3	0000	0	
16bit INT	4	0000	0	
16bit INT	5	0000	0	
32bit Float	6	41E0 0000	22.000000	Live Weight
16bit INT	8	0430	1072	
16bit INT	9	0002	2	Active Weigh Program
16b String2	10	6B67	kg	Weigh Unit
16bit INT	11	000B	11	
16bit INT	12	0140	320	Command - READ
16bit INT	13	0020	32	Param - Auto Page Data

**Figure 1-29** Reading from SpeedAC iQ data register

- Set the **Function Code** value to **16** (Write Data).

Let's say that we are willing to know what page of the SpeedAC iQ Controller is currently displayed on the screen.

The registers **12** and **13** are respectively linked to **Command** (WRITE = 304, READ = 320) and **Parameters**.

The actual parameter is **32** for **Auto Page Data** (see [Figure 1-29](#)).

Access the **Report Page** by writing their Command and Parameter from the PLC (320 and 40 respectively as per [Figure 1-30](#)).

Data-Write Register# Bytes		
320.0000	0	0140
40.0000	1	0028
0.0000	2	0000
0.0000	3	0000
0.0000	4	0000

**Figure 1-30 Data write to SpeedAC iQ controller**

The results are shown in [Figure 1-31](#) below as per updated fields in registers 12 and 13.

Data Type	Register#	Bytes	Results	Comments
16bit INT	0	0258	600	Automatic Mode
16bit INT	1	0007	7	Ready to Discharge
16bit INT	2	0000	0	
16bit INT	3	0000	0	
16bit INT	4	0000	0	
16bit INT	5	0000	0	
32bit Float	6	41B0 0000	22.000000	Live Weight
16bit INT	8	0420	1056	
16bit INT	9	0002	2	Active Weigh Program
16bit String2	10	6B67	kg	Weigh Unit
16bit INT	11	000B	11	
16bit INT	12	0140	320	Command - READ
16bit INT	13	0028	40	Param - Report Page
32bit Float	14	4220 0000	40.000000	
32bit Float	16	41B0 0000	22.000000	

**Figure 1-31 Reading report page data**

## D PROFINET Configuration - Data Access

This section briefly describes the way to access the Data Words from the SpeedAC iQ using PROFINET Fieldbus module.

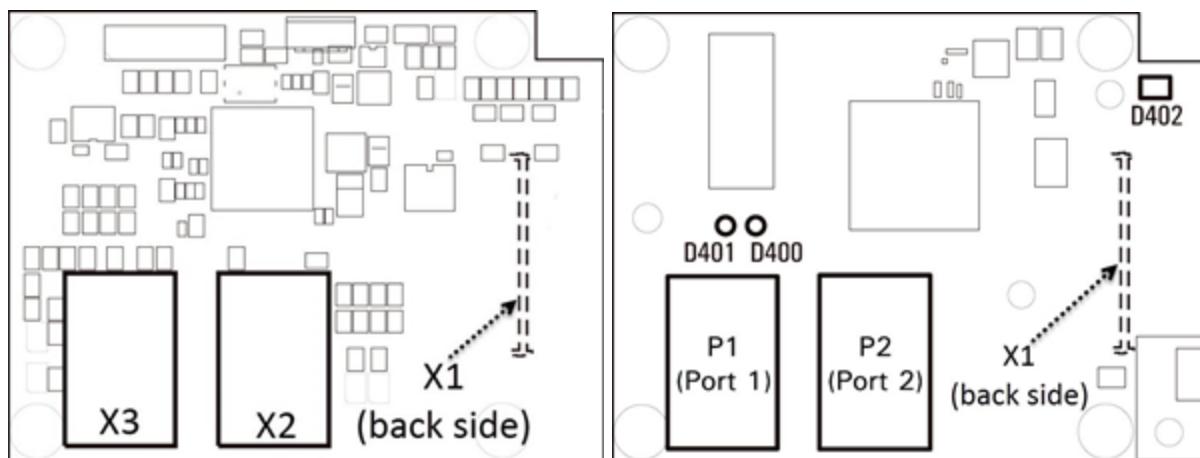


As this content is related to Siemens material and software, we recommend you to check their Industry Online Support webpage to get the assistance for configuring your devices and install the required software at:

<https://support.industry.siemens.com/cs/start?lc=en-WW>

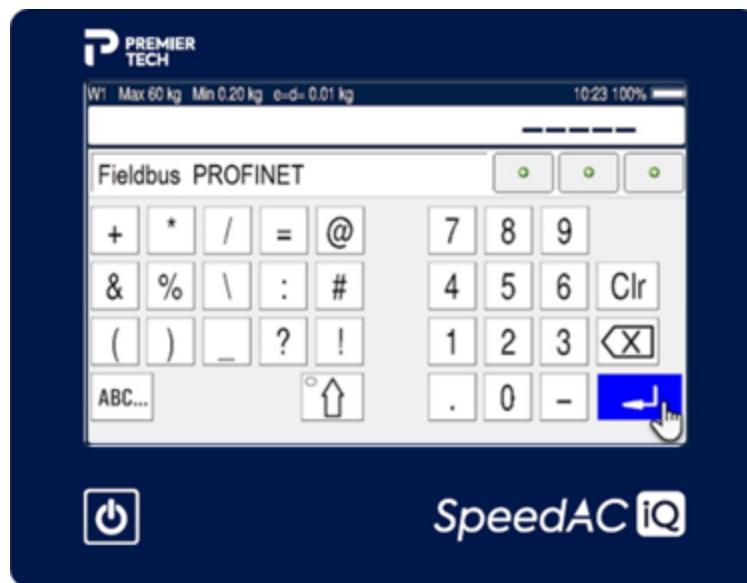
## D.1 Preliminary Steps on SpeedAC iQ Controller

Make sure you have correctly installed the IT8000ET PROFINET card module on the SpeedAC iQ Controller Mainboard referenced either PNU or PNX depending on the card you own. Then, connect a RJ45 cable to one of the slots X2 or P1 (X3 or P2 respectively as per [Figure 1-32](#)).



**Figure 1-32 Connection of PROFINET modules PNU and PNX (left to right respectively)**

Please follow the steps described in section [B.1](#) for the Service Mode to establish the PROFINET connection with the PLC as per [Figure 1-33](#).



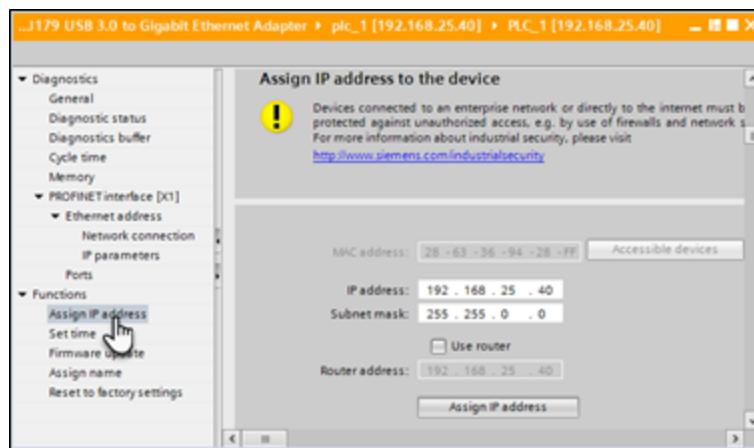
**Figure 1-33 Selecting PROFINET option**

- Exit the Service Mode using the up arrow in the middle. The SpeedAC IQ Controller will restart to apply changes.

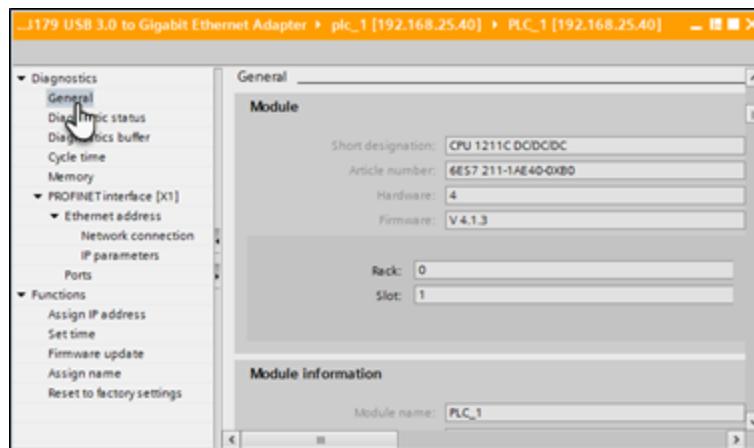
## D.2 Accessing Data Words

In this section, TIA Portal v13 software from Siemens will be used to configure the access to the SpeedAC iQ Controller Registers via the PLC 1211C family (catalog number: 6ES7 211-1AE40-0XB0).

- Open TIA Portal or a Siemens compatible software and create a new project by adding your PLC with an IP address in the range of IP of your PC as well. The IP address of the PC for this example is 192.168.25.50. [Figure 1-34](#) shows the IP setup for our PLC.



**Figure 1-34 PLC IP address assignment screen**

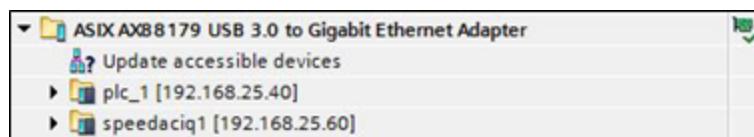


**Figure 1-35 PLC general information screen**

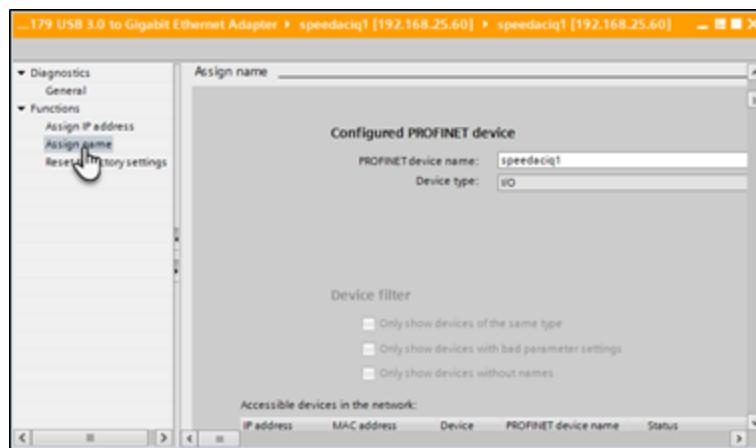
- Assign an IP address and a name to your SpeedAC iQ controller.



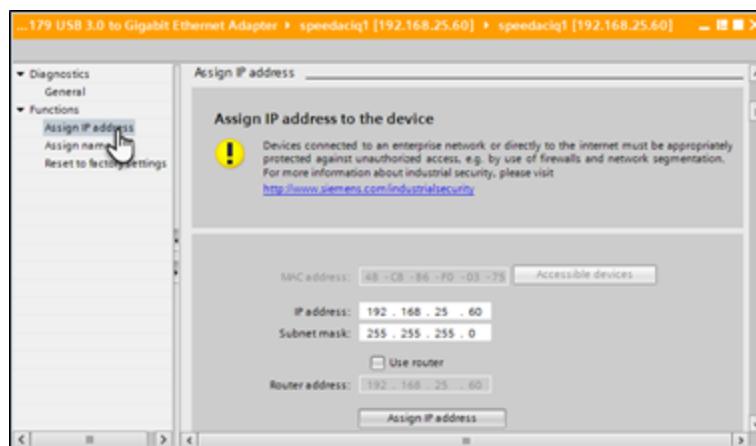
The name chosen for the controller must be reflected as the same in all part of the SpeedAC iQ device configuration. The name used for the SpeedAC iQ controller is **speedaciq1** and its IP address **192.168.25.60** (see [Figure 1-36](#) to [Figure 1-38](#)).



**Figure 1-36 SpeedAC iQ name and IP address on network card adapter view**

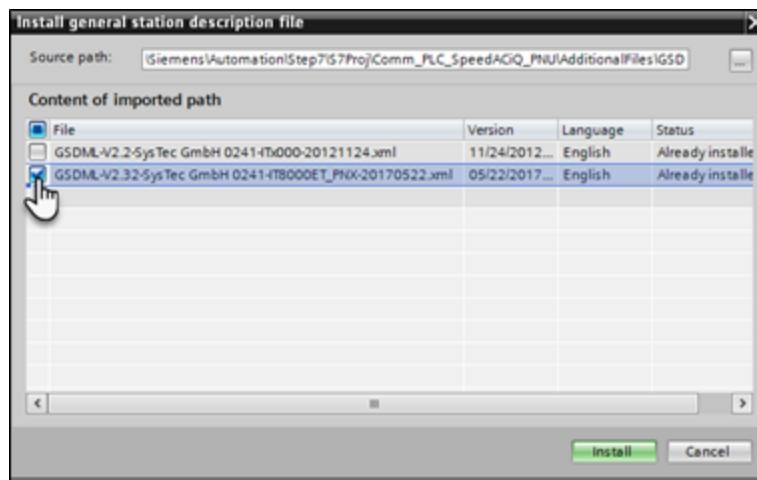


**Figure 1-37 SpeedAC iQ name assignment screen**



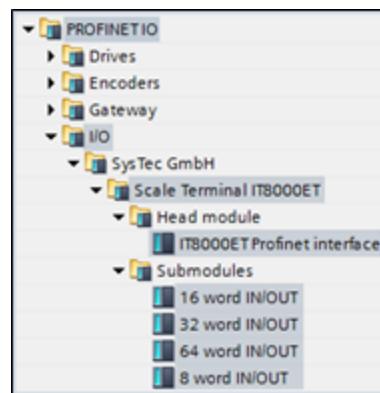
**Figure 1-38 SpeedAC iQ IP address assignment screen**

- Make sure to download the GSD file (General Station Description) from our SpeedAC iQ knowledge Base (GSDML-V2.32-SysTec GmbH 0241-IT8000ET\_PNX-20170522.xml), which contains a description of the PROFIBUS DP/PA or PROFINET device and provides you a way for an open configuration tool to automatically get the device features. The file can be downloaded from the Software library under: GSD - PROFINET PNX.zip.
- Follow the steps to install the GSD file in TIA Portal project by running the Install General Station Description wizards from the **Option** tab on your software. The install screen should look like the one shown in [Figure 1-39](#).



**Figure 1-39 GSD file install screen**

- Then, check that the package is successfully installed and available in the software catalog list view as per [Figure 1-40](#).



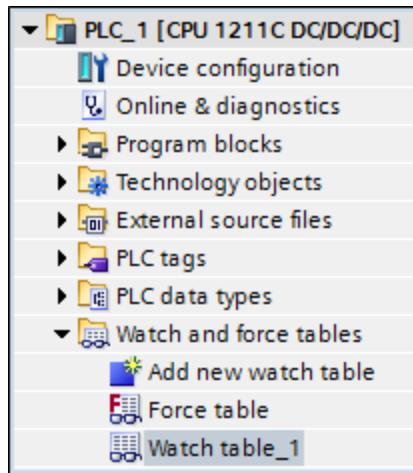
**Figure 1-40 IT8000ET GSD File Catalog List Screen**

- Download your project to the PLC and ensure that your CPU is toggled to RUN mode as per [Figure 1-41](#).



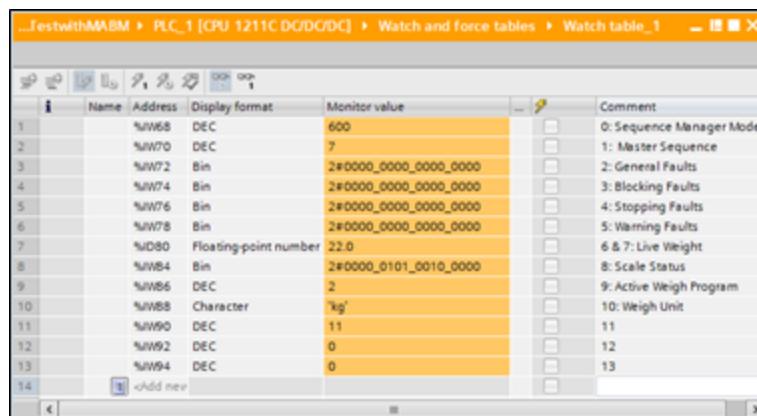
**Figure 1-41 PLC in RUN mode screen**

- Use the Watch and Force Tables to add a new **Watch table\_1** as shown in Figure 1-42.



**Figure 1-42 Watch table\_1 screen**

- Refer to the Communication Parameters Table in the current document to add the input values to be monitored as described in Figure 1-43.



The screenshot shows a table titled 'Watch table\_1' with 14 rows of data. The columns are labeled: Name, Address, Display format, Monitor value, and Comment. The table lists various memory locations and their corresponding values and comments. Row 14 contains a button labeled 'Add new'.

	Name	Address	Display format	Monitor value	Comment
1	%W68	DEC	600		0: Sequence Manager Mode
2	%W70	DEC	7		1: Master Sequence
3	%W72	Bin	2#0000_0000_0000_0000		2: General Faults
4	%W74	Bin	2#0000_0000_0000_0000		3: Blocking Faults
5	%W76	Bin	2#0000_0000_0000_0000		4: Stopping Faults
6	%W78	Bin	2#0000_0000_0000_0000		5: Warning Faults
7	%D80	Floating-point number	22.0		6 & 7: Live Weight
8	%W84	Bin	2#0000_0101_0010_0000		8: Scale Status
9	%W86	DEC	2		9: Active Weigh Program
10	%W88	Character	'kg'		10: Weigh Unit
11	%W90	DEC	11		11
12	%W92	DEC	0		12
13	%W94	DEC	0		13
14		Add new			

**Figure 1-43 SpeedAC iQ inputs Watch table\_1**

## E Profibus DP Configuration - Data Access

This part briefly describes the way to access the Data Words from the SpeedAC iQ using Profibus DP Fieldbus module.

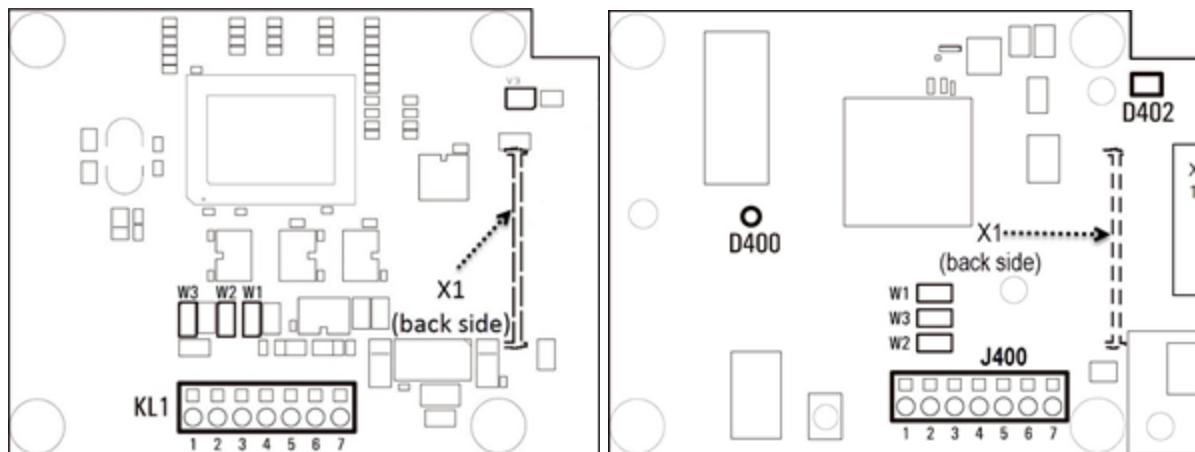


The same advice as for section 5 is applicable in this part regarding the fact of using Siemens material and software. We recommend you to check their Industry Online Support webpage for further details at:

<https://support.industry.siemens.com/cs/start?lc=en-WW>

## E.1 Preliminary Steps on SpeedAC iQ Controller

Make sure that you have correctly installed the IT8000ET Profibus DP card module on the SpeedAC iQ Controller Mainboard referenced either PBU or PBX depending on the card you own (see [Figure 1-44](#)).



**Figure 1-44 Connection of Profibus DP modules PBU and PBX (left to right respectively)**



The following information is crucial to validate the wiring on the circuit board.

- KL1 connection 4 and 6 are bridged on the circuit board as 5 and 7 as well to make easy the connection of other devices on Profibus DP if required (this is also applicable for the connector J400 on PBX card).
- Connection 2 and 3 are only used for the terminating resistor (if you use an external terminating resistor).

Please refer to refer to the Connection of Profibus Module PBU/PBX section in IT8000ET Technical Manual for further details.

Please follow the steps described in [section B.1](#) for the Service Mode to establish the Profibus DP connection with the PLC as per [Figure 1-45](#).

Once the Profibus DP Fieldbus communication is selected, we need to set and validate the Address on the next screen that will be used by the PLC to communicate with the SpeedAC iQ controller (see [Figure 1-46](#)).

With the PBU expansion module, the weighing terminal operates as a Profibus DP slave with an I/O interface (up to 64 inputs and outputs) or a data interface with up to 64 input words and up to 64 output words.



Figure 1-45 Selecting Profibus DP option



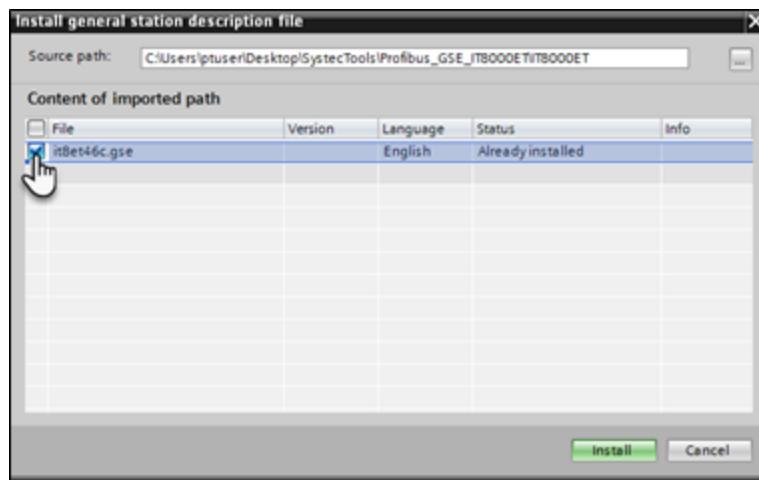
Figure 1-46 Selecting Profibus DP address

## E.2 Accessing Data Words

We keep using the same material configuration as the one in section D to collect our data from the PLC with TIA Portal v13 software from Siemens in this part.

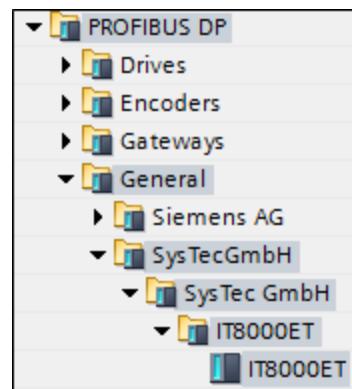
- Open our existing program to add and configure the features of the Profibus DP card.

- Make sure that you've downloaded the GSE Catalog file (**IT8ET46C.gse**) from our SpeedAC iQ knowledge Base, which contains a description of the PROFIBUS DP/PA. The file can be downloaded from the **Software library** under: **GSD - PROFIBUS GSE.zip**.
- Run the **Install General Station Description** wizards from the **Option** tab on your software. The install screen should look like the one shown in [Figure 1-47](#).



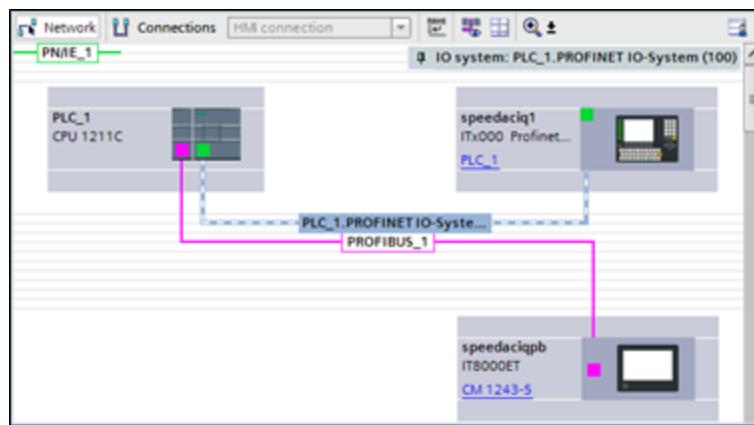
**Figure 1-47 Catalog file install screen**

- Then, check that the package is successfully installed and available in the software catalog list view as per [Figure 1-48](#).



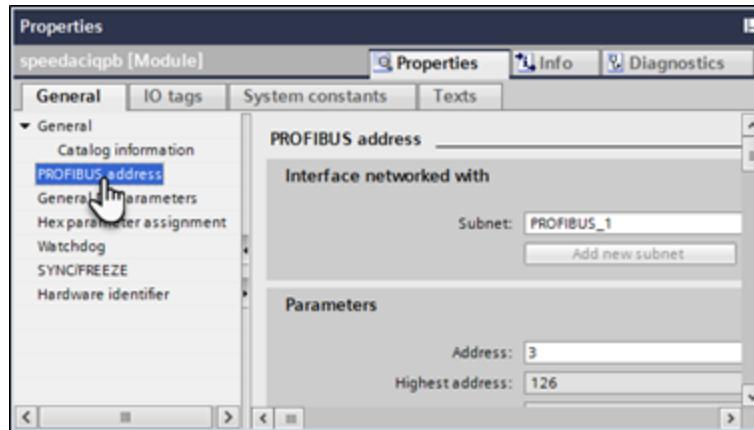
**Figure 1-48 GSD file list view**

- Add the SpeedAC iQ controller to your network and assign a name to this device (e.g: speedaciqb as per [Figure 1-49](#)).



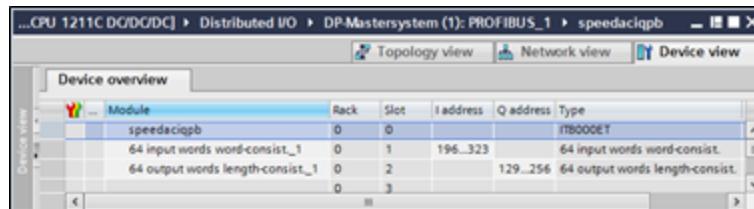
**Figure 1-49 Network view of SpeedAC iQ with Profibus DP**

- Check that the **Address** value is the same as the one entered in the **Service Mode** from section E.1 (see [Figure 1-50](#)).



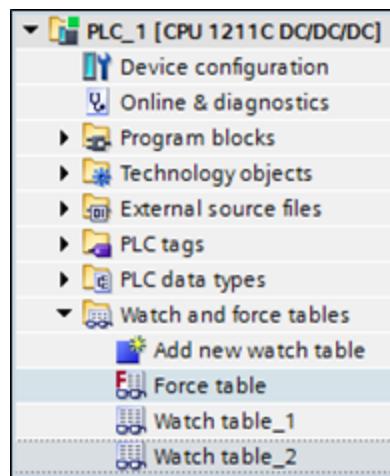
**Figure 1-50 SpeedAC iQ Profibus DP address screen**

- Add inputs and outputs range to be monitored from the catalog list (see [Figure 1-51](#)).

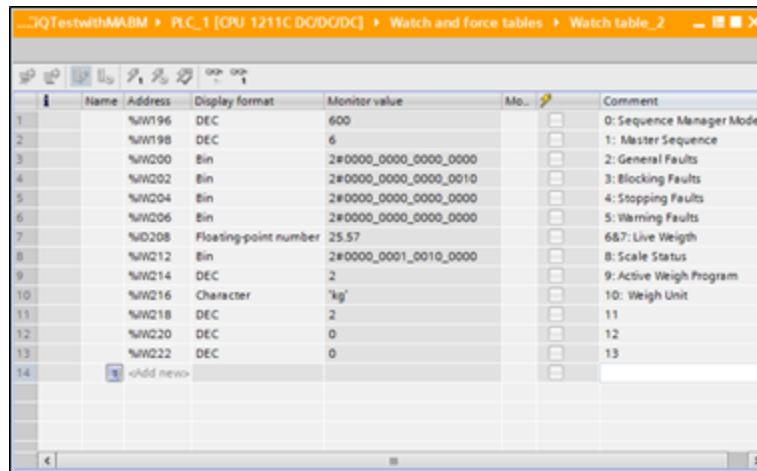


**Figure 1-51 I/O range for monitoring**

- Download the program to the PLC and switch to RUN mode. Now you can generate a new Watch\_Table2 from the **Watch and force tables** option (see [Figure 1-52](#)).



**Figure 1-52 Watch table\_2 screen**



This screenshot displays the 'Watch table\_2' window for the SpeedAC iQ inputs. It lists 14 monitored variables with their addresses, display formats, monitor values, and comments. The columns are labeled: #, Name, Address, Display format, Monitor value, Mo., and Comment.

#	Name	Address	Display format	Monitor value	Mo.	Comment
1	%W196	DEC		600		0: Sequence Manager Mode
2	%W198	DEC		6		1: Master Sequence
3	%W200	Bin		2#0000_0000_0000_0000		2: General Faults
4	%W202	Bin		2#0000_0000_0000_0010		3: Blocking Faults
5	%W204	Bin		2#0000_0000_0000_0000		4: Stopping Faults
6	%W206	Bin		2#0000_0000_0000_0000		5: Warning Faults
7	%D208	Floating-point number		25.57		6&gt;: Live Weigh
8	%W212	Bin		2#0000_0001_0010_0000		8: Scale Status
9	%W214	DEC		2		9: Active Weigh Program
10	%W216	Character		'kg'		10: Weigh Unit
11	%W218	DEC		2		11
12	%W220	DEC		0		12
13	%W222	DEC		0		13
14	<add new>					

**Figure 1-53 SpeedAC iQ inputs Watch Table\_2**

## SpeedAC iQ Communication Protocol

Block Command Format				
Read/Write request from Fieldbus device				
Description	Output Register Offset	Data Type	States	Comments
Command number	0	Float (32 bits)	304 = Write, 302 = Read	
Parameter data	2	Float (32 bits)	parameter #	see table "SpeedAC iQ Bagging Communication Parameters"
Value	4	Float (32 bits)	value #	see table "SpeedAC iQ Bagging Communication Parameters"
Handshake	6	Float (32 bits)	any value	Used to "handshake", see Scale Status bit 9

Description	Input Register offset	Data Type	States
Command Status	14	Float (32 bits)	Command Status # = Command executed correctly
			Command Status # + 100 = Could not execute Command - invalid state or value out of range
			100 = invalid request
			200 = action cannot be perform twice in a row
			-1 = String or requested action out of range
			length of string if string is requested

## SpeedAc iQ Bagging Communication Parameters

Fieldbus Output Register			Fieldbus Input Register					
Command Number		Parameter	Value	Description	Register Offset	Data Type	States	Comments
Set	Read	Write Commands						
304			0	No operation				
			20	Reset Production Report				
			22	Reset Batch Report				
			30	Start				
			31	Stop				
			33	Cancel Cycle				Off mode
			34	Clear Fault				
			35	Bypass Check				Toggle Bypass Check On-Off
			40	Zero the Scale				
304		32	#	WP Number			# = number of the desired Weigh Program	Machine must be in OFF mode
304		33	#	Batch Preset			# = preset for Batch	Machine must be in OFF mode or Batch Ended
Live Information (Read)								
				Sequence Mode Manager	0	Integer (16 Bits)	100 = Off Mode	
							300 = Stopping Mode	
							500 = Preparation Mode	
							600 = Automatic Mode	

Fieldbus Output Register				Fieldbus Input Register				
Command Number		Parameter	Value	Description	Register Offset	Data Type	States	Comments
Set	Read							
				Master Sequence	1	Integer (16 Bits)	1 = Initial Sequence	
							2 = Waiting Downstream equipment	
							3 = Run and wait for unit detection	
							4 = Unit Entry	
							5 = Evaluation (bag in between sensors)	
							6 = Wait Result	
							7 = Exit unit for stopping or zeroing	
							Bit number	
				General Faults	2	Integer (16 Bits)	0 = Emergency Stop	Binary Coded
							1 = System Error	
							2 = Scale Exceeded Capacity	
							3 = Motor Failure	
							Bit number	
				Blocking Faults	3	Integer (16 bits)	0 = Both Photocells blocked	Binary Coded
							1 = Scale Exceeded Capacity	
							2 = Entry Photocell blocked	
							3 = Exit Photocell blocked	
							Bit number	
				Stopping Faults	4	Integer (16 Bits)	0 = Stabilization Too Long	Binary Coded
							1 = Zero Out Of Range	

Fieldbus Output Register				Fieldbus Input Register				
Command Number		Parameter	Value	Description	Register Offset	Data Type	States	Comments
Set	Read						Bit number	
				Warning Faults	5	Integer (16 Bits)	0 = Low Battery	Binary Coded
				Live Weight	6 & 7	Float (32 Bits)		
Bit number								
				Scale Status	8	Integer (16 Bits)	0 = In Service Mode	
							1 = Scale Overloaded	
							2 = Scale In Motion	
							3 = Scale Error	
							4 = Fieldbus Communication Heart beat	
							5 = Production Data Ready for update	
							6 = Handshake 0=Handshake Reg. Is 0 1=Handshake Reg not 0	
							7 = Swap Bytes (Fieldbus) 0 = Bytes not Swapped 1= Bytes Swapped in Integer (Allen-Bradley)	
							8 = Batch Ended	
							9 = Weight Checked	
							10 = Bypass Check Mode: 0=Check weight, 1=Bypass Check	
							11 = Free	

Fieldbus Output Register				Fieldbus Input Register				
Command Number		Parameter	Value	Description	Register Offset	Data Type	States	Comments
Set	Read							
							12 = Free	
							13 = Free	
							14 = Free	
							15 = Free	
				Active Weigh Program	9	Integer (16 Bits)		Number of weigh program
				Weigh Unit	10	Integer (16 Bits)	"kg" or "lb"	2 ASCII character string
				Decimal numbers	11	Integer (16 Bits)	Number of decimals for weight values (floating point)	
				Command	12	Integer (16 Bits)	Requested Command "Echo" from PLC output word	
				Parameter	13	Integer (16 Bits)	Requested Parameter "Echo" from PLC output word	
Auto Page Data (Read)								
				Command Status	14	Float (32Bits)	32	
				WP No	16	Float (32Bits)		Weigh Program Number
				Target Weight	18	Float (32Bits)		
				Average	20	Float (32Bits)		
				Standard Deviation	22	Float (32Bits)		1 sigma

Fieldbus Output Register				Fieldbus Input Register				
Command Number		Parameter	Value	Description	Register Offset	Data Type	States	Comments
Set	Read							
320	32			Last Checked	24	Float (32Bits)		
				Accepted Units	26	Float (32Bits)		
				Weighments/Unit done	28	Float (32Bits)		
				Weighments/Unit preset	30	Float (32Bits)		
				Units Done	32	Float (32Bits)		
				Batch Units	34	Float (32Bits)		
				Batch Preset	36	Float (32Bits)		
				Weighments/Min	38	Float (32Bits)		
				Bulk Time	40	Float (32Bits)		
				Dribble Time	42	Float (32Bits)		
				Cycle Time	44	Float (32Bits)		

Fieldbus Output Register				Fieldbus Input Register			
Command Number	Parameter	Value	Description	Register Offset	Data Type	States	Comments
Set	Read						
Live Information (send without any request if no other page is read)							

Fieldbus Output Register				Fieldbus Input Register				
Command Number		Parameter	Value	Description	Register Offset	Data Type	States	Comments
Set	Read							
				Target Weight	16	Float (32Bits)		
				Average	18	Float (32 Bits)		
				Standard deviation	20	Float (32Bits)		
				Last Checked	22	Float (32 Bits)		
				Weighments/Min	24	Float (32Bits)		
				Production Units	26	Float (32 Bits)		
				Production Total Weight	28	Float (32Bits)		
				Production Underweight Reject	30	Float (32 Bits)		
				Production Underweight Accept	32	Float (32Bits)		
				Production Units Accepted	34	Float (32Bits)		
				Production Overweight Accept	36	Float (32Bits)		
				Production Overweight Reject	38	Float (32Bits)		
				Production Invalid Weighments	40	Float (32Bits)		
				Batch Preset	42	Float (32Bits)		
				Batch Units	44	Float (32Bits)		

Fieldbus Output Register				Fieldbus Input Register				
Command Number		Parameter	Value	Description	Register Offset	Data Type	States	Comments
Set	Read							
				Batch Total Weight	46	Float (32Bits)		
				Batch Underweight Reject	48	Float (32Bits)		
				Batch Underweight Accept	50	Float (32Bits)		
				Batch Units Accepted	52	Float (32Bits)		
				Batch Overweight Accept	54	Float (32Bits)		
				Batch Overweight Reject	56	Float (32Bits)		
				Batch Invalid Weighments	58	Float (32Bits)		
				Production Total Units LifeTime	60	Float (32Bits)		
				Production Total Weight LifeTime	62	Float (32Bits)		
Auto Page Data (Read)								
				Command Status	14	Float (32 Bits)	32	
				WP No	16	Float (32 Bits)		Weigh Program Number
				Target Weight	18	Float (32 Bits)		
				Average	20	Float (32 Bits)		
				Standard Deviation	22	Float (32 Bits)		1 sigma
				Last Checked	24	Float (32 Bits)		

Fieldbus Output Register				Fieldbus Input Register				
Command Number		Parameter	Value	Description	Register Offset	Data Type	States	Comments
Set	Read							
320	32			Weighments/Min	26	Float (32 Bits)		
				Units Done	28	Float (32 Bits)		If Batch preset = 0
				Batch Units	30	Float (32 Bits)		If Batch preset > 0
				Batch Preset	32	Float (32 Bits)		
				Production Underweight Reject	34	Float (32 Bits)		Values are from Batch if batch Preset > 0 (from WP otherwise)
				Production Underweight Accept	36	Float (32 Bits)		
				Production Units Accepted	38	Float (32 Bits)		
				Production Overweight Accept	40	Float (32 Bits)		
				Production Overweight Reject	42	Float (32 Bits)		
				Production Invalid Weighments	44	Float (32 Bits)		
Report Page (Read)								
				Command Status	14	Float (32 Bits)	40	
				WP Nominal weight	16	Float (32 Bits)		
				Production Units	18	Float (32 Bits)		Unit Done
				Production Total Weight	20	Float (32 Bits)		

Fieldbus Output Register				Fieldbus Input Register				
Command Number		Parameter	Value	Description	Register Offset	Data Type	States	Comments
Set	Read							
				Production Underweight Reject	22	Float (32 Bits)		
				Production Underweight Accept	24	Float (32 Bits)		
40	40			Production Units Accepted	26	Float (32 Bits)		
				Production Overweight Accept	28	Float (32 Bits)		Total Weighments
				Production Overweight Reject	30	Float (32 Bits)		
				Production Invalid Weighments	32	Float (32 Bits)		Total Weighments
				Production Total Units LifeTime	34	Float (32 Bits)		Total Units
				Production Total Weight LifeTime	36	Float (32 Bits)		Total Weight
<b>Batch Page (Read)</b>								
				Command Status	14	Float (32 Bits)	50	
				Batch Preset	16	Float (32 Bits)		
				Target Weight	18	Float (32 Bits)		
				Batch Average	20	Float (32 Bits)		
				Batch Standard Deviation	22	Float (32 Bits)		
				Batch Total Weight	24	Float (32 Bits)		

Fieldbus Output Register				Fieldbus Input Register				
Command Number		Parameter	Value	Description	Register Offset	Data Type	States	Comments
Set	Read							
	320	50		Batch Underweight Reject	26	Float (32 Bits)		
				Batch Underweight Accept	28	Float (32 Bits)		
				Batch Units Accepted	30	Float (32 Bits)		
				Batch Overweight Accept	32	Float (32 Bits)		
				Batch Overweight Reject	34	Float (32 Bits)		
				Batch Invalid Weighments	36	Float (32 Bits)		
				Batch Units Done	38	Float (32 Bits)	1 = Accepted include underweighments and overweighments	
Weigh Program Page 1 (Read)								
				Command Status	14	Float (32 Bits)	61	
				Underweight Reject	16	Float (32 Bits)		
				Underweight Accept	18	Float (32 Bits)		
				Nominal Weight	20	Float (32 Bits)		
				Overweight Accept	22	Float (32 Bits)		
				Overweight Reject	24	Float (32 Bits)		

Fieldbus Output Register				Fieldbus Input Register				
Command Number		Parameter	Value	Description	Register Offset	Data Type	States	Comments
Set	Read							
	320	61		Tare weight	26	Float (32 Bits)		
				Weigh Unit	28	Float (32 Bits)	0 = kg - 1 = lb	
				Bag Length	30	Float (32 Bits)		mm or inches
				Dynamic Offset	32	Float (32 Bits)		
				Reject Configuration	34	Float (32 Bits)	0=Both - 1=Under Only - 2=Over Only	
				Reject Delay	36	Float (32 Bits)		
				Reject Time	38	Float (32 Bits)		
<b>Weigh Program Page 2 (Read)</b>								
	320	62		Command Status	14	Float (32 Bits)	64	
				Flexible Timer 1	16	Float (32 Bits)		
				Flexible Timer 2	18	Float (32 Bits)		
				Flexible Counter	20	Float (32 Bits)		
				Flexible Setpoint 1	22	Float (32 Bits)		
				Flexible Setpoint 2	24	Float (32 Bits)		
<b>Machine Configuration Page 1 (Read)</b>								
				Command Status	14	Float (32 Bits)	71	

Fieldbus Output Register				Fieldbus Input Register				
Command Number		Parameter	Value	Description	Register Offset	Data Type	States	Comments
Set	Read							
		Com 2			16	Float (32 Bits)	0 = None	Production Report
							1 = Cont. Out	Port Continuous Output
							2 = Unit Rec. String	Unit Record String
							3 = Report to Printer	
		USB			18	Float (32 Bits)	0 = None	Production Report Port
							1 = Unit Rec. String	
							2 = Unit Rec. File	Unit Record File
							3 = Report to Printer	
		Ethernet			20	Float (32 Bits)	0 = None	Production Report Port
							1 = Cont. Out	
							2 = Unit Rec. String	
							3 = Report to Printer	
			Number of Weigh Programs		22	Float (32 Bits)		
			OIML Application		24	Float (32 Bits)	0 = No	
							1 = Yes	

Fieldbus Output Register				Fieldbus Input Register				
Command Number		Parameter	Value	Description	Register Offset	Data Type	States	Comments
Set	Read							
		320	71	Language #2	26	Float (32 Bits)	1 = English	
				Language #3	28		2 = Arabic	
							3 = Chinese	
							4 = Czech	
							5 = Danish	
							6 = Dutch	
							7 = French	
							8 = German	
							9 = Hungarian	
							10 = Italian	
							11 = Polish	
							12 = Portuguese	
							13 = Romanian	
							14 = Russian	
							15 = Slovak	
							16 = Spanish	
							17 = Thai	
							18 = Turkish	

Fieldbus Output Register				Fieldbus Input Register				
Command Number	Parameter	Value	Description	Register Offset	Data Type	States	Comments	
Set	Read							
<b>Machine Configuration Page 2 (Read)</b>								
							Value	
320	72		Command Status	14	Float (32 Bits)	73		
			Operator Password	16	Float (32 Bits)			
			Supervisor Password	18	Float (32 Bits)			
			Operator Logout Delay	20	Float (32 Bits)			
			Supervisor Logout Delay	22	Float (32 Bits)			
			PT Logout Delay	24	Float (32 Bits)			
			System Type	26	Float (32 Bits)	0=Metric - 1=Imperial	For lenght and Speed	
<b>Machine Parameters Page 1 (Read)</b>								
320	81		Command Status	14	Float (32 Bits)	81		
			Entry photocell Timeout	16	Float (32 Bits)			
			Entry photocell Timeout	18	Float (32 Bits)			
			Autotune function	20	Float (32 Bits)		ON/OFF	
			Screen Saver Time	22	Float (32 Bits)			
			Photocells distance	24	Float (32 Bits)		mm or inches	
			Belt Speed	26	Float (32 Bits)		m/s or FT/min	

Fieldbus Output Register				Fieldbus Input Register			
Command Number	Parameter	Value	Description	Register Offset	Data Type	States	Comments
Set	Read						
<b>Machine Parameters Page 2 (Read)</b>							
							<b>Value</b>
320	82		Command Status	14	Float (32 Bits)	83	
			Flexible Timer 1	16	Float (32 Bits)		
			Flexible Timer 2	18	Float (32 Bits)		
			Flexible Counter	20	Float (32 Bits)		
			Flexible Setpoint 1	22	Float (32 Bits)		
			Flexible Setpoint 2	24	Float (32 Bits)		
<b>String info (Read)</b>							
			String length	14	Float (32 Bits)	Length of Returned String	9 for example below

Fieldbus Output Register				Fieldbus Input Register				
Command Number		Parameter	Value	Description	Register Offset	Data Type	States	Comments
Set	Read							
Read any WP name							<b>Value # = any WP # - desired name</b>	<b>Ex. of WP name: "50KG Salt"</b>
320	99	Value #	Character 1 & 2	16	Integer (16Bits)	1 = WP Name	"50"	
			Character 3 & 4	17	Integer (16Bits)	2 = Batch Name	"KG"	
			Character 5 & 6	18	Integer (16Bits)	3 = Batch Details	" S"	
			Character 7 & 8	19	Integer (16Bits)	4 = Plant Line Name	"al"	
			Character 9 & 10	20	Integer (16Bits)	5 = Serial Number	"t"	
			Character 11 & 12	21	Integer (16Bits)	6 = Customer Name	""	
			...	...	Integer (16Bits)	7 = Customer Location	""	
			Character 93 & 94	23	Integer (16Bits)	8 = Support Phone Number	""	
			Character 95 & 96	24	Integer (16Bits)	9 = Support Fax Number	""	

## Input and Output Descriptions

INPUTS	
Name	Description
Photocell at Entry	Sensor use for bag detection at CHECKWEIGHER entry (mandatory). This input must always be at address 0 (on PIM). If bag detected, set the input to ON, <b>Service Mode Calibration/Group 5 Adaptation – Check Dyn.Cal -Start Mode</b> must be set to <b>LB N/O</b> . If bag not detected, set the input to OFF, the <b>Start Mode</b> must be set to <b>LB N/C</b> .
Photocell at Exit	Sensor use for bag detection at CHECKWEIGHER exit (mandatory). This input must always be at address 1 (on PIM). If bag detected, set the input to ON, <b>Service Mode Calibration/Group 5 Adaptation – Check Dyn.Cal -Stop Mode</b> must be set to <b>LB N/O</b> . If bag not detected, set the input to OFF, the <b>Stop Mode</b> must be set to <b>LB N/C</b> .
Downstream ready	Signal coming from equipment following the CHECKWEIGHER (mandatory). When this signal is <b>ON</b> , the CHECKWEIGHER is allowed to send the bag to the next conveyor. Otherwise, bag will be stopped at the end of the equipment.
Start	If configured, when it goes ON, the CHECKWEIGHER will begin the starting process. This is the same function as the <b>Start</b> key in the <b>Auto</b> screen.
Emergency stop	Emergency stop signal: If configured, signal must be ON for operation. If input goes OFF, it generates a general fault.
Motor failure	Motor failure signal: If configured, signal must be ON for operation. If input goes OFF, it generates a general fault.
Clear faults	If configured, this input is used to clear the faults. This is the same function as the <b>Clear faults</b> key in <b>Auto</b> screen.
Stop	If configured, when it goes ON, the CHECKWEIGHER will begin the stopping process, in order to stop with the conveyor empty. This is the same function as the <b>Stop</b> key in the <b>Auto</b> screen.
Change WP IN1	If configured, inputs change WP IN1 to IN4 are used together, in a BCD format, to request a Weigh program change from 1 to 15.

INPUTS	
Name	Description
Change WP IN2	If configured, inputs change WP IN1 to IN4 are used together, in a BCD format, to request a Weigh program change from 1 to 15.
Change WP IN3	If configured, inputs change WP IN1 to IN4 are used together, in a BCD format, to request a Weigh program change from 1 to 15.
Change WP IN4	If configured, inputs change WP IN1 to IN4 are used together, in a BCD format, to request a Weigh program change from 1 to 15.
Change WP IN - PWM	<b>Weigh Program</b> selection via Pulse Width Modulation (Activate 0.25 seconds X Weigh Program number, i.e. 1 sec for WP #4).
Flex input #1	If configured, this input can be used to build an optional logic thru Flex IOs feature.
Flex input #2	If configured, this input can be used to build an optional logic thru Flex IOs feature.

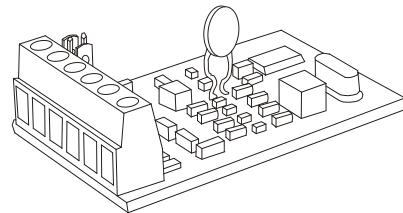
OUTPUTS	
Name	Description
Start conveyor	This signal is used to start the CHECKWEIGHER conveyor belt (mandatory). The control of the conveyor has to be made by the SpeedAC iQ.
Ready to receive	This signal is used to allow the previous equipment to send a bag to the CHECKWEIGHER. If OFF, the preceding conveyor should stop (mandatory).
Fault	If configured, this output will turn ON whenever there is a fault of any type. This is the ONLY output that can be ON in OFF mode.
Zero Request	If configured, this signal will turn ON if zeroing is necessary on the CHECKWEIGHER. Production rate might be slowed down to allow it. Otherwise, if <b>DYN. AZ Mode</b> (Auto Zero - Service Mode - Calibration) is set to <b>AUTO</b> and <b>DYN. AZ Per. Time</b> has elapsed, the Ready to receive signal will turn OFF to allow zeroing process.

OUTPUTS	
Name	Description
Reject unit	If configured, this output will turn ON if a unit is to be rejected. It will reject only Underweight, only Overweight or both depending of <b>Weigh Program</b> parameter <b>Reject Configuration</b> . It will turn ON after <b>Reject unit delay</b> (triggered by Photocell at Exit) and will stay on during <b>Reject unit time</b> .
Unit checked	If configured, this signal will turn ON every weight checked, when bag reach photocell at exit, and will stay on for 1 second.
Tolerance Over - reject	If configured, this signal will turn ON when weight meet <b>Weigh Program Overweight Reject</b> criteria OR if considered Invalid. It will stay ON until next unit check is completed.
Tolerance Over - accept	If configured, this signal will turn ON when weight meet <b>Weigh Program Overweight Accept</b> criteria OR if considered Invalid. It will stay ON until next unit check is completed.
Tolerance Good	If configured, this signal will turn ON when weight meet <b>Weigh Program Acceptance</b> criteria. It will stay ON until next unit check is completed.
Tolerance Under - accept	If configured, this signal will turn ON when weight meet <b>Weigh Program Underweight Accept</b> criteria OR if considered Invalid. It will stay ON until next unit check is completed.
Tolerance Under - reject	If configured, this signal will turn ON when weight meet <b>Weigh Program Underweight Reject</b> criteria OR if considered Invalid. It will stay ON until next unit check is completed.
WP Number OUT1	If configured, <b>Weigh program</b> number OUT1-OUT4 will reflect, in BCD, the <b>Weigh program</b> number from 1 to 15. Only works if in Auto.
WP Number OUT2	If configured, <b>Weigh program</b> number OUT1-OUT4 will reflect, in BCD, the <b>Weigh program</b> number from 1 to 15. Only works if in Auto.
WP Number OUT3	If configured, <b>Weigh program</b> number OUT1-OUT4 will reflect, in BCD, the <b>Weigh program</b> number from 1 to 15. Only works if in Auto.
WP Number OUT4	If configured, <b>Weigh program</b> number OUT1-OUT4 will reflect, in BCD, the <b>Weigh program</b> number from 1 to 15. Only works if in Auto.

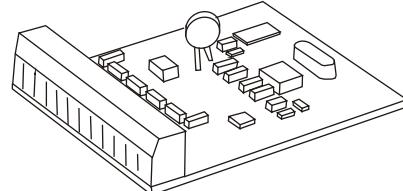
OUTPUTS	
Name	Description
WP Number OUT - PWM	<b>Weigh Program</b> status via Pulse Width Modulation. When <b>Weigh Program</b> is changed, it will be Activated 0.25 seconds X Weigh Program number, i.e. 1 sec for WP #4.
Flex output #1	If configured, custom setup can be programmed in <b>Flex iQ</b> pages.
Flex output #2	If configured, custom setup can be programmed in <b>Flex iQ</b> pages.
Flex output #3	If configured, custom setup can be programmed in <b>Flex iQ</b> pages (Counter function).

## Calibration Manual

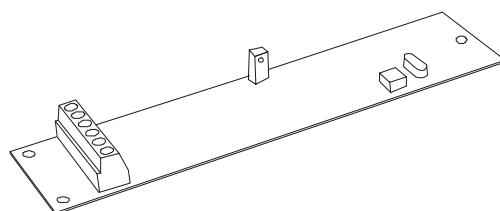
**ADM:**  
**IT3000M, IT4000E**  
**IT6000E(T),**  
**IT8000E(T)**  
**IT9000E, IT8000**  
**IT8000 Ex2/22**  
**IT3000M Ex2/22**  
**IT4000E Ex2/22**  
**IT6000E Ex2/22**  
**IT8000E Ex2/22**



**DUAL-ADM:**  
**IT3000M, IT4000E**  
**IT6000E(T)**  
**IT3000M Ex2/22**  
**IT4000E Ex2/22**  
**IT6000E Ex2/22**



**ADM8000-Exi:**  
**IT8000Ex**



February 2016

ST.2309.0688

Rev. 20



**Calibration Manual ADM / DUAL-ADM / ADM8000-Exi**

Date: February 05, 2016

File: ADM\_KAE.DOC

Program Version:

IT3000M, IT4000E, IT6000E(T), IT8000E(T), IT9000E	as of SCALE 2.0.0
IT8000, IT8000Ex, IT8000Ex2/22	as of RTP 8.00 and OTP CPU8000 4.00
ADCBox	as of RTP 8.00 and OTP SEM 4.00

**Published By:**

© SysTec Systemtechnik und Industrieautomation GmbH, Bergheim, Germany

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, mechanical, photocopying, recording, or otherwise, without the prior written permission of SysTec GmbH.

Terms and product names mentioned in this publication are trademarks, registered trademarks or service marks of their respective owners. Use of a term should not be regarded as affecting the validity of any trademark, registered trademark or service mark.

**Please Note:**

While every precaution has been taken in the preparation of this manual, SysTec GmbH assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein.

The publisher is grateful for any information and/or advice that may contribute to correct errors or omissions in following editions.

## Contents

<b>1 Introduction .....</b>	<b>7</b>
1.1 General Description .....	7
1.2 Documentation .....	7
1.3 Safety Instructions.....	7
1.4 Technical Features .....	7
1.5 Display And Keyboard .....	11
1.6 Operator Prompting .....	16
1.7 Specific Features Of IT8000, IT8000Ex, IT8000Ex2/22, IT9000E .....	17
<b>2 Access To Calibration Mode.....</b>	<b>18</b>
2.1 IT3000M .....	19
2.2 IT4000E (Ex2/22), IT6000E (Ex2/22), IT8000E (Ex2/22).....	20
2.3 IT6000ET, IT8000ET .....	21
2.4 IT8000, IT8000Ex, IT8000Ex2/22 .....	22
2.5 IT9000E .....	22
2.6 Select Scale 1 To 8 IT8000, IT8000Ex2/22 .....	23
<b>3 Calibration Mode .....</b>	<b>24</b>
3.1 Select Group .....	24
3.2 Scale Parameters .....	24
3.3 Calibration .....	27
3.4 Linearization.....	29
3.5 Zero Adjust .....	30
3.6 Adaptation.....	31
3.7 High Resolution .....	33
3.8 Reset Parameters.....	34
3.9 Calculate Span .....	35
3.10 W&M Info.....	36
3.11 Factory Calibration .....	36
3.12 Overview Calibration Mode.....	37
<b>4 Mastermode.....</b>	<b>39</b>
4.1 Info Zero-Offset.....	39
4.2 Adapt Mode .....	39
4.3 Calibration Mode SUMMING .....	43
<b>5 Securing Scale Parameters .....</b>	<b>45</b>
<b>6 Geo Values .....</b>	<b>46</b>
<b>7 Error Messages .....</b>	<b>48</b>
7.1 Error Log Of Scale.....	50



# 1 Introduction

## 1.1 General Description

The analog to digital converter unit **ADM** is designed to provide direct connection to scales with one strain gauge loadcell.

The analog to digital converter unit is designed to provide direct connection to scales with one strain gauge loadcell (**ADM/ADM8000-Exi**) or to scales (**DUAL-ADM**).

The parameter settings are stored in an EEPROM and can be sealed by Weights & Measures Authorities to prevent unauthorized access.

## 1.2 Documentation

This documentation is valid only in conjunction with the respective Technical Manual.

- IT3000M, order-No.: ST.2309.1501
- IT3000M Ex2/22, order-No.: ST.2309.1645
- IT4000E, order-No.: ST.2309.1193
- IT4000E Ex2/22, order-No.: ST.2309.1597
- IT6000E, order-No.: ST.2309.1204
- IT6000E Ex2/22, order-No.: ST.2309.1601
- IT6000ET, order-No.: ST.2309.1476
- IT8000E, order-No.: ST.2309.1188
- IT8000E Ex2/22, order-No.: ST.2309.1605
- IT8000ET, order-No.: ST.2309.1472
- IT8000, order-No.: ST.2309.0426
- IT8000Ex, order-No.: ST.2309.0851
- IT8000Ex2/22, order-No.: ST.2309.1327
- IT9000E, order-No.: ST.2309.0813

## 1.3 Safety Instructions

The safety instructions in the Technical Manual of the respective weighing terminal must absolutely be adhered to. This applies in particular to installations in hazardous area.

## 1.4 Technical Features

The terminal connects to understructures with a maximum of 16 strain gauge loadcells with an impedance of 350 W each. The loadcells may be connected to the terminal in any combination, as long as the maximum of 16 loadcells in total is not exceeded. Installation of the scale interface modules and connection to the loadcells is described in the respective Technical Manual.

For the connection of a second understructure with analog loadcells a DUAL-ADM or an additional ADM module is required (not for IT8000Ex).

Socket	IT3000M, IT4000E, IT6000E(T), IT3000M Ex2/22 IT4000E Ex2/22, IT6000E Ex2/22	IT8000E(T), IT8000E Ex2/22, IT9000E, IT8000, IT8000Ex2/22
ADM1	ADM or DUAL-ADM	1. ADM
ADM2	–	2. ADM

### 1.4.1 IT8000Ex Scales With Intrinsically Safe Strain Gauge Loadcell (IT8000ADM-Exi)

The IT8000Ex terminal connects to a maximum of 4 intrinsically safe strain gauge loadcells with a min. impedance of 350 W each, total impedance of loadcells 87.5 W ... 4500 W. For installation of the IT8000-Exi module and the connection of loadcells refer to Technical Manual IT8000Ex.

### 1.4.2 W&M Approved Applications - Scale Resolution

The W&M certified resolution (Scale Capacity / Scale Interval) is:

6000 increments with a maximum of 80% dead load.

### 1.4.3 Multiple-Range Scale

The A/D converter can be configured as Single-, Dual- or Triple-Range Scale. The different ranges have different capacities and scale intervals.

Example: Triple-Range Scale with a resolution of 3000 increments for each range:

First range: 0 – 1500kg / 0.5kg

Second range: 0 – 3000kg / 1.0kg

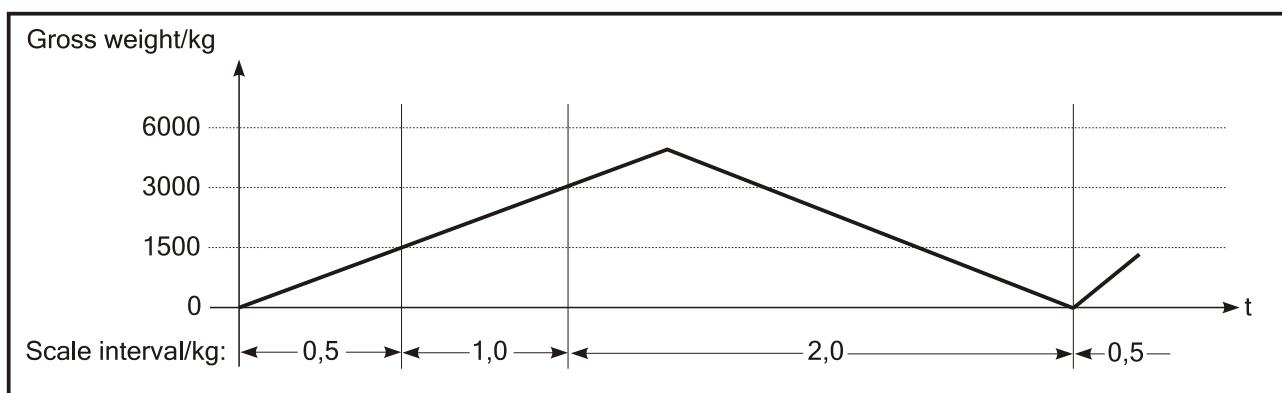
Third range: 0 – 6000kg / 2.0kg

When a Multiple-Range Scale is loaded, the scale display changes automatically from a lower to a higher range.

During unloading of the scale, the scale display remains in the higher range. If the scale was tared (weighing in net mode), on return to gross zero the tare is only cleared when the tare key is pressed. Only after clearing the tare, the display returns to gross mode and switches back to the smallest range.

Only when the scale is not tared (weighing in gross mode) the display is automatically switched back to the smallest range on return to zero.

Example of a weight curve for loading and unloading a Multiple-Range Scale showing the weight and the displayed scale interval:



When the scale is loaded further after it was tared, the tare weight is rounded automatically to the next scale interval as soon as the display is switched from one range to the next.

The Multiple-Range Scale provides weighing of light and heavy loads on the same scale with a high degree of accuracy.

Ranges and intervals can be selected freely. However, the permissible resolution of the loadcells (e.g. 3000d) must not be exceeded in any of the ranges.

#### 1.4.4 Multi-Interval Scale

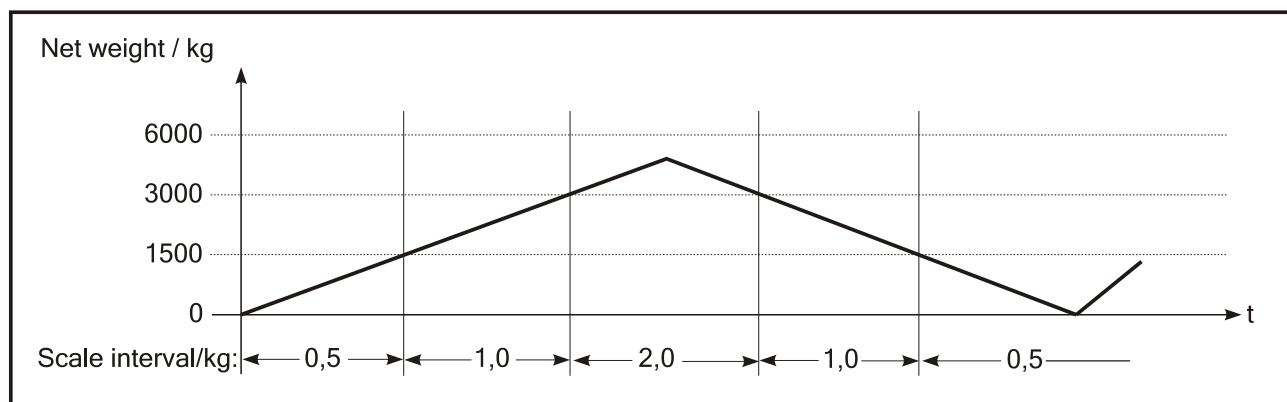
A *Single-Range Scale* can be configured as *Multi-Interval Scale* with two or three different intervals.

Example for a Triple-Interval Scale:

First interval range:	0kg	- 1500kg / 0.5kg
Second interval range:	1500kg	- 3000kg / 1.0kg
Third interval range:	3000kg	- 6000kg / 2.0kg

The scale display changes automatically from one interval range to the next during loading and unloading of the scale.

Example weight curve for loading and unloading a Multi-Interval Scale showing the weight and the scale interval displayed:



After taring the scale, the scale display shows the net weight with the smallest scale interval. Small weights are shown with the highest accuracy, even when the scale is already loaded to a higher weighing range. Restriction: The tare weight must not exceed the weight of the range with the smallest interval.

Ranges and intervals can be selected freely. However, the limitations that apply to analog loadcells for Multi-Interval Scales must be observed.

#### 1.4.5 Summing Scale

**Only for IT8000, IT8000Ex2/22, IT8000E(T), IT8000E Ex2/22, IT9000E:** If two scales are connected, the combination of two A/D converters can be combined as Summing Scale. This configuration provides weight data of the individual scales and the summing scale.

Both scales must be configured with the same unit. Capacity, scale interval and overload must be set separately for the summing scale.

### 1.4.6 Adaptation To Scale Environment

The following parameters can be set to obtain optimum weighing results.

Motion Window / Motion Counter	Size of measurements for motion detector
Filter Size	Filter strength of the digital filter for unstable scales
Auto Zero Range	Range for auto zero tracking
Pushbutton Zero	Range for zero setting via Zero-key
Power Up Zero	Range for automatic zero setting on power up
Overload	Overload threshold for display blanking
NTEP approval?	Set measuring parameters compliant to US regulations (National Type Evaluation Program) in accordance with Handbook 44.
Underload 20d?	Blanking of weight display when gross weight smaller than -20d
Update Rate	Choose update rate for digital filtering

### 1.4.7 Zero And Tare Memory (IT8000 Only)

IT8000 features zero and tare memory; i.e. after power off and on, zero and tare values are restored. The zero memory is active when the parameter 'Power Up Zero' is set to 'Off', it can be disabled with the setting  $\pm 2\%$  or  $\pm 10\%$ . In that case, however, the scale must be within power up zero range when it is switched on.

### 1.4.8 Calibration And Setting Of Geo Value

Before the scale is calibrated, the Geo Value must be entered, e.g. Great Britain = 21 (see also chapter Geo Values). If the scale is calibrated at one location and moved to another location later, it is sufficient to re-enter the Geo Value of the new location (only for scales that are not subject to W&M approval).

### 1.4.9 Weights & Measures Approved Applications

The highest W&M certified resolution (Scale Capacity / Scale Interval) is 6000 increments (with a maximum of 80% dead load).

The single capacity of each scale in a summing scale (IT8000, IT8000E(T), IT9000E only) must be equal or greater 60% of the summing scale capacity.

W&M approved installations require parameter setting in the group 'Adaptation' as follows:

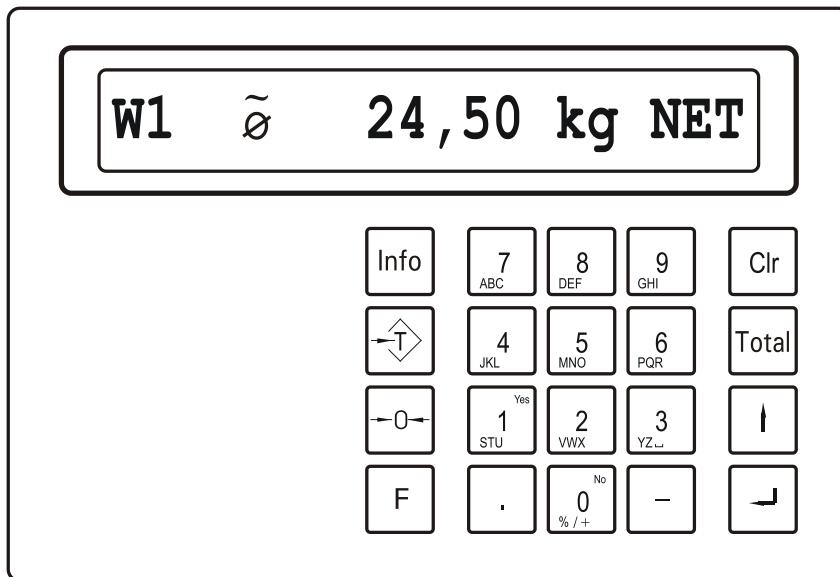
Motion Window	0.5D
Motion Counter	-
Auto Zero Range	0.5D
Pushbutton Zero	$\pm 2\%$
Power Up Zero	$\pm 2\%$ or $\pm 10\%$ *)
Overload	max. 9 D

\*) Depending on the characteristics of a specific application, also the setting 'Off' may be acceptable (e.g. for hopper scales).

The scale settings are stored in an EEPROM and can be sealed by Weights & Measures to prevent unauthorized modification.

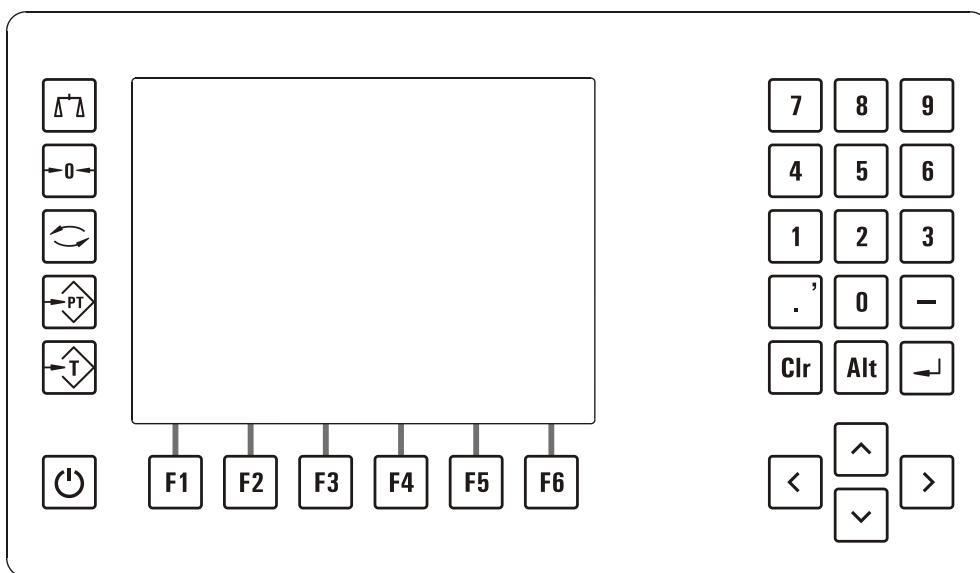
## 1.5 Display And Keyboard

### 1.5.1 IT3000M



Display line:		Gross or net weight or operator prompt and entry
	Ø	Symbol: Scale in gross zero range ( $\pm 0.2d$ )
	~	Symbol: Scale in motion
Info and scale keys:	Info	Scrolling forward, call up Service Mode in the initial step
	→T	Taring (Autotare), if scale is tared: clear tare
	→0←	Set gross weight to zero
Function keys:	F1 – F8	Press F-key and numeric key (1 - 8) simultaneously to access function defined in application program (see below);
	F1 / F2	Switching scale 1 < -> scale 2 when two scales are installed (in the steps defined in the application program);
	F0	Switch weight display to tenfold resolution (in the basic step of the sequence), display falls back to normal mode after approx. 5 sec.
	F-	Activate alphanumeric entries
	F.	Activate numeric entries
Special keys	Clr	Numeric entry: press key once ® clear entry Alphanumeric entry: short key stroke ® clear last character (can be repeated several times to clear more than one character); hold key down for approx. 1 sec ® clear the whole entry
	-	Return to previous program step
	↓	Confirm entry, continue with next program step
	Total	Display / print totals (if defined in the operating sequence and the printout)
Numeric keypad:		Entry of numeric data, confirmation 'Yes' (= 1) - 'No' (= 0) and entry of alpha characters via multiple key assignment

### 1.5.2 IT4000E (Ex2/22), IT6000E (Ex2/22), IT8000E (Ex2/22)



and	<b>Alt Key:</b> Pressed simultaneously with Scale-Select-key: Enter Service Mode
	<b>Scale Select Key</b> for switching the weight display to one of a max. of 8 scales.
	<b>Set Zero Key</b> to set the displayed scale to zero (only within zero setting range, selectable in calibration mode)
	<b>Display Select Key</b> to switch the display between tare weight / gross weight / gross bargraph / data archive
	<b>Tare Entry Key</b> to enter a known tare weight in the tare line, confirm with Enter- or OK-key.
	<b>Tare Key</b> alternately taring of currently displayed weight or clearing the tare weight
	Short key stroke ® clear last character (can be repeated several times to clear more than one character); hold key down for approx. 1 sec ® clear the whole entry
	Select menu
	Confirm entry, continue with next program step
	Return to previous program step
	<b>Shift Key</b> for capital letters

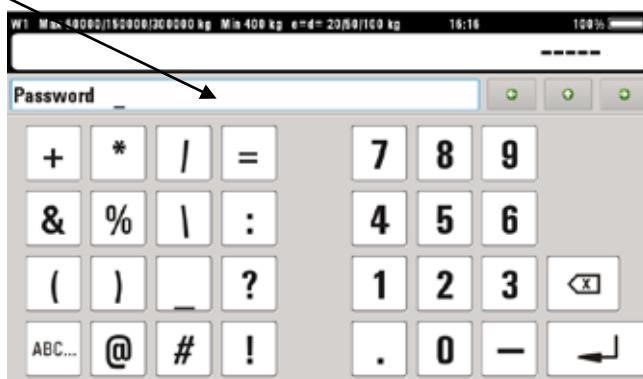
**Note:** The IT8000E (Ex2/22) has an additional alphanumeric keyboard.

### 1.5.3 IT6000ET, IT8000ET

With a long touch (min. 2 sec) on the weight display the Service Mode can be called up.

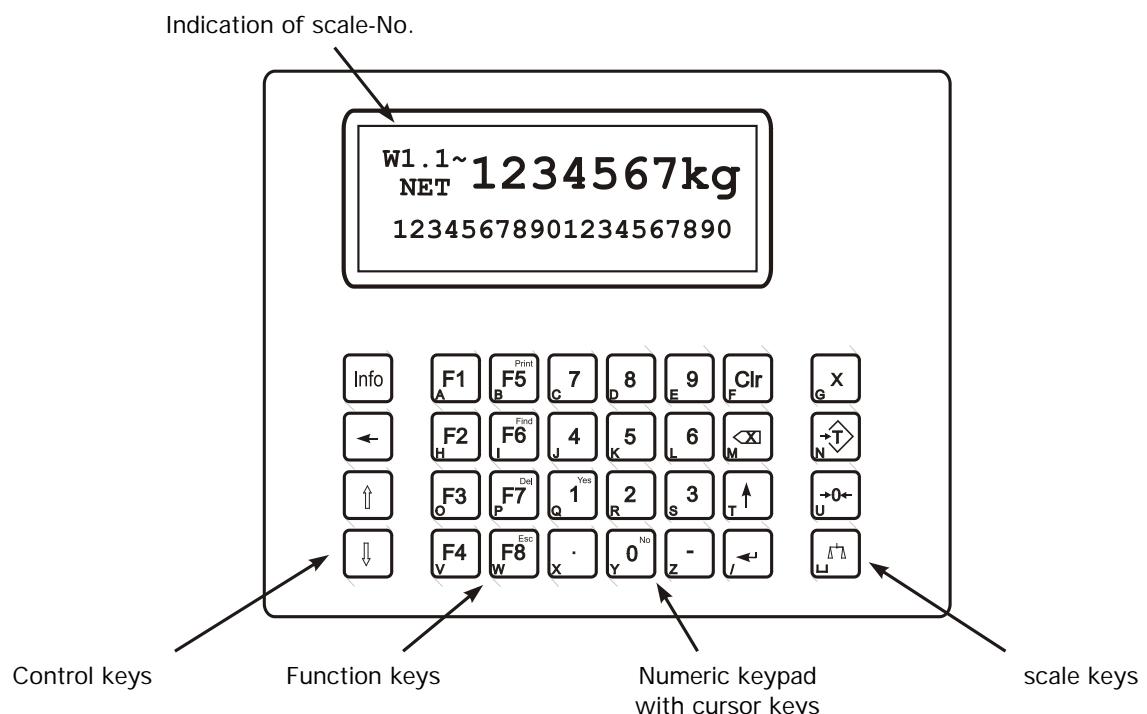


Service Mode entries are made in the info line.



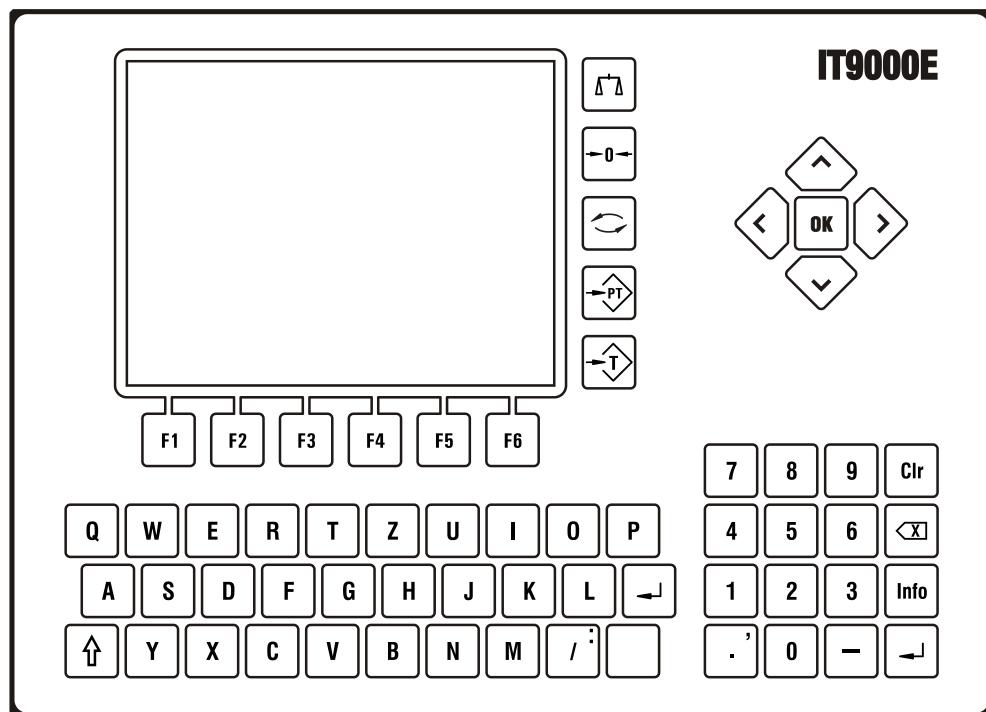
	Set Zero Key to set the scale to zero
	Tare Key for alternately taring of currently displayed weight or clearing the tare weight.
	Display Select Key to switch the display between tare weight / gross weight / gross bargraph / data archive.
	Tare Entry Key to enter preset tare in the tare line, the value is applied after confirmation with the Enter-key.
	Scroll menu
	Confirm entry, proceed to next program step
	Back one level

### 1.5.4 IT8000, IT8000Ex, IT8000Ex2/22



	<b>Info</b>	Forward scrolling
	¬	Backwards scrolling
<b>Control keys</b>	Ý Info	Access to Service Mode
	Ý	Pressed simultaneously with alpha key: upper case letter
	ß	Pressed simultaneously with alpha key: lower case letter
<b>Function keys</b>	F1 - F8	Functions depending on application program
<b>Clear keys</b>	Clr	Clear entry
	Ó	Delete last character
<b>Cursor key</b>	-	Return to previous program step
<b>Enter key</b>	♂	Confirm entry, continue with next program step
<b>Scale keys</b>	X	Show net weight with tenfold resolution for 5 sec (only in tare step of operating mode Simple Weighing, if enabled in Service Mode)
	→T	Automatic taring, if scale is tared: clear tare
	→0←	Set selected scale to zero
	Δ	Select scale (applicable only if two scales installed)

### 1.5.5 IT9000E



and	Shift Key for capital letters Pressed simultaneously with Scale-Select-key: Enter Service Mode
	Scale Select Key for switching the weight display to one of a max. of 8 scales.
	Set Zero Key to set the displayed scale to zero (only within zero setting range, selectable in calibration mode)
	Display Select Key to switch the display between tare weight / gross weight / gross bargraph / data archive
	Tare Entry Key to enter a known tare weight in the tare line, confirm with Enter- or OK-key.
	Tare Key alternately taring of currently displayed weight or clearing the tare weight
	Clear input field
	Rub out last character
	Select menu
	Confirm entry, continue with next program step
	Return to previous program step

## 1.6 Operator Prompting

The following sections describe the operating sequence of the weighing terminal with operator prompts and the requested entries.

The contents of the terminal display is shown in a frame on the left hand side. Next to the display the possible operator entries are listed, on the right hand side comments and explanations are shown.

**Example:**

Calibr.Weight 999999

Entry of the 6-digit calibration weight

Press Enter-key to continue

Enter Key  and 

In all program steps, unless otherwise specified, the enter key  leads to the next step. Pushing the -Key (Up-key) leads to the previous step.

**Numeric Entries (Numerals Only):**

A requested numeric entry is depicted by '99999'. The length of the string corresponds to the maximum length of the entry, (e.g.: 99 = 2 digits, numeric).

Numeric entries are made from right to the left. As defined in the program, entry of decimal point and minus sign may be accepted. Fixed point data entries already show the right number of decimals.

**Note:** In all input steps Clr-key must be pressed to delete old value before a new value can be entered.

**Confirm Prompts with Y (1) or N (0):**

A prompt or question, e.g. 'Save parameters? Y', is acknowledged by pressing the key '1' and subsequently the -key. By pressing '0' and the -key a negative confirmation is given and -in this case- the parameters are not saved.

**Select Functions or Groups, e.g. 'Select Group':**

In program steps that require the selection of a function, the options can be displayed by means of the keys  and  (scrolling). By pressing the enter key  the displayed function is selected. Alternatively, the function can also be started directly by entering the corresponding number in the step 'Select Group'. Function selection can be exited by pressing the  key.

**Parameter Choice, e.g. 'Filter Size OFF':**

In program steps that require the selection of a parameter, the options can be displayed by means of the keys  and  (scrolling). By pushing the enter key  the displayed parameter is selected. The selection can be exited via the  key.

Prompts or entries that apply only under certain conditions are shown in an extra frame. The condition is shown in bold face in the upper left hand corner of the frame.

**Conditional Display or Entry, Example:**

If Single-Range Scale is specified:

One Interval

This prompt appears only if Single-Range Scale has been chosen.

## 1.7 Specific Features Of IT8000, IT8000Ex, IT8000Ex2/22, IT9000E

**Select function or group**, e.g. 'Select Function 1-8':

In program steps that require the selection of a function or a group, the options can be displayed by means of the -key (scrolling). By pressing the Enter-key , the displayed function is selected.

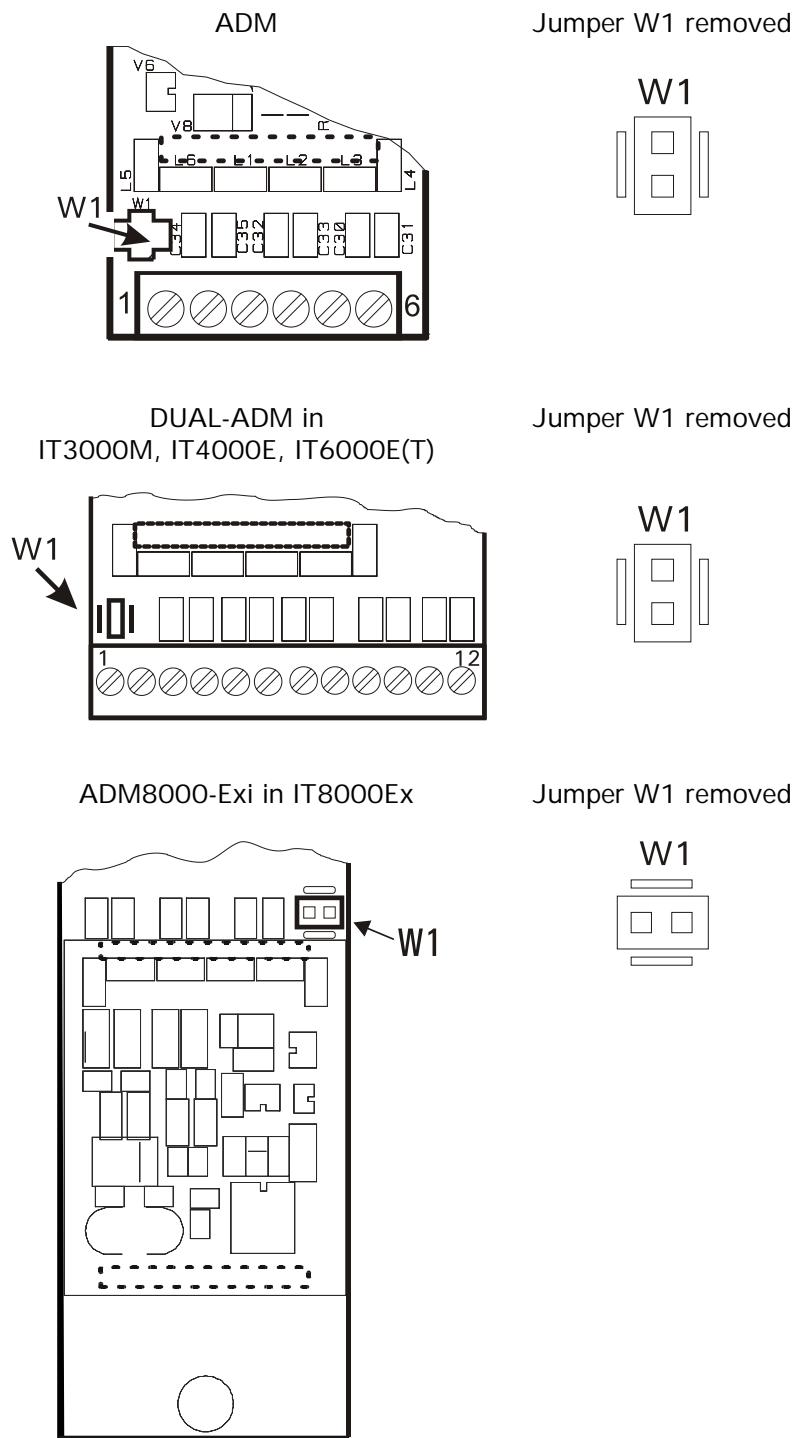
Alternatively, the function can also be started directly by entering the corresponding number in the step 'Select Group'. Function selection can be exited by pressing the -key.

**Parameter choice**, e.g. '**Filter Size** OFF':

In program steps that require the selection of a parameter, the options can be displayed by means of the -key (scrolling). By pressing the Enter-key , the displayed parameter is selected. The selection can be exited via the -key.

## 2 Access To Calibration Mode

Prior to power up the jumper W1 must be removed. Only with this jumper setting can the changed parameters be stored in memory after the calibration.



## 2.1 IT3000M

After power up the terminal, the messages with display of program version and date and time are displayed briefly. By pressing the Info-key while the power up messages are displayed, the Service Mode is called up. After that the program proceeds to the initial step.

IT3000M ..	Display during power up sequence (approx. 12 sec)
IT3000M 9.99 99999	
03.09.01 10:41	Date and time
Info	Call up Service Mode
Service Mode	
Password ?????	Entry of 4-character Service Mode password
Setup: Service	<input type="button" value="→"/> Service settings
Service: Interface	Info
Service: Calibration	Calibration mode
	<input type="button" value="→"/> Call up displayed group
Calibrate Scale 1	Info Choose scale
Select Group 1-9	Continue in section 'Calibration Mode'

## 2.2 IT4000E (Ex2/22), IT6000E (Ex2/22), IT8000E (Ex2/22)

The calibration dialog is displayed in the line underneath the scale display. Calibration mode is called up after the start sequence.

**Alt** and 

**ID:** 81154926 / v3.01

Show ident-No. of operating system and version of W&M approved software for 2 sec and continue.

**Password:** ???? 

Entry of the 4-character service password

**Service:** Interface 

**Service:** Calibration 

**Calibrate Scale 1**  

Select scale

**Note:** With pressing the F1-key the error log of the scale can be viewed.

**Select Group 1-9** 

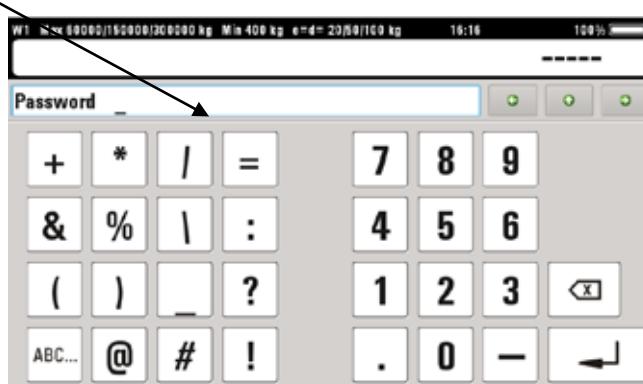
Continue in section 'Calibration Mode'

## 2.3 IT6000ET, IT8000ET

With a long touch (min. 2 sec) on the weight display the Service Mode can be called up.



Service Mode entries are made in the info line.



**ID: 81154926 / V3.01**

ID of operating system and the version of the approved software are shown briefly.

**Password:**

Entry of password (4 digits)

**Service: Interface**

**Service: Calibration**



**Calibrate Scale 1**



Select scale

**Note:** With pressing the F1-key the error log of the scale can be viewed.



**Select Group 1-9**

Continue in section 'Calibration Mode'

## 2.4 IT8000, IT8000Ex, IT8000Ex2/22

After power up, the display shows for approx. 3 sec the power up message:

W1	Scale
----	-------



Enter calibration mode

W1	Scale
Select Group 1-9	

By pressing the -key while the power up message is displayed, the calibration mode can be accessed.

## 2.5 IT9000E

In the line underneath the scale display, the dialog for the calibration is shown.



and

ID: 81154926 / V3.01
----------------------

ID of operating system and the version of the approved software are shown briefly.

Password:                   ????
----------------------------------

Entry of the 4-character service password

Service: Interface
--------------------



Service: Calibrate
--------------------

Call up calibration mode

Calibrate Scale 1
-------------------



Select scale



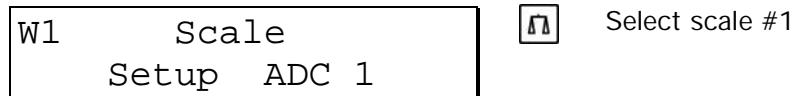
Select Group 1-9
------------------

Continue in section 'Calibration Mode'

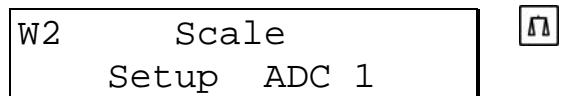
## 2.6 Select Scale 1 To 8 IT8000, IT8000Ex2/22

At first select scale that is to be calibrated (1 - 8).

**Note:** Before any scale can be accessed in calibration mode, it must be configured in group 1 of the Service Mode. Scale #1 and #2 are always assigned to the two ADM modules on the main board inside the IT8000 housing, the higher numbers refer to the external extension module (ADCBox).



If more than one A/D module is installed and enabled in Service Mode, the display shows the scale numbers W1 to Wn one after the other. Press Scale-key to enter calibration mode while desired scale-No. is displayed.



### 3 Calibration Mode

#### 3.1 Select Group

After selecting the scale, the main menu is shown.

**Note:** IT8000, IT8000Ex, IT8000Ex2/22 show the scale-No. in the upper line of the display, e.g. 'W1 Scale'.

Select Group 1-9	Select calibration group:
	1 Scale Parameters
	2 Calibration
	3 Linearization
	4 Zero Adjust
	5 Adaptation
	6 High Resolution (tenfold resolution)
	7 Reset Parameters
	8 Calculate Span: Calibration without test weights
	9 W&M Info
<input type="button" value="&lt;"/> <input type="button" value="&gt;"/>	Scrolling
<input type="button" value="Info"/>	(Info for IT3000M, IT8000, IT8000Ex2/22, IT9000E only)
<input type="button" value="→"/>	Scrolling backwards (IT8000, IT8000Ex2/22 only)
<input type="button" value="^"/>	Save parameters and return to main menu

The parameter setting and calibration follows the sequence of the group numbers (1, 2, 3, 4) as described in the following chapters. After pressing the -key in step 'Select Group', the display shows the message:

Save Parameters? Y	Save calibration in memory.
	1 Y Save calibration data in EEPROM
	0 N Ignore changes

If calibration jumper W1 was not removed:

Error Calibr. Jumper	Error message: calibration jumper in wrong position, storing the calibration parameters is not possible.
----------------------	----------------------------------------------------------------------------------------------------------

#### 3.2 Scale Parameters

In this group the weighing ranges, scale intervals and the scale unit are selected. The scale can be configured as Single-Range, Dual-Range or Triple-Range Scale. A Single-Range Scale can be configured as Multi-Interval Scale with two or three different scale intervals.

Select Group 1-9	1 Scale Parameters
Single Range	<input type="button" value="&lt;"/> <input type="button" value="&gt;"/> Select number of scale ranges: <input type="button" value="Info"/> Single Range: Single-Range Scale with one, two or three intervals Dual Range: Scale with two ranges Triple Range: Scale with three ranges

**IT8000, IT8000Ex, IT8000Ex2/22:** If 'Single Range' has been selected:

W1	Scale
One Interval	

[<] [>]  
Info

A Single-Range Scale can be configured as Single-Interval or Multi-Interval Scale:  
 One Interval  
 Two Intervals  
 Three Intervals  
 Two Intervals T+  
 (scale with two intervals and additive tare)  
 Three Intervals T+  
 (scale with three intervals and additive tare)

**IT4000E, IT6000E(T), IT8000E(T), IT9000E:** If 'Single Range' has been selected:

One Interval	
--------------	--

[<] [>]

A Single-Range Scale can be configured as Single-Interval or Multi-Interval Scale:  
 One Interval  
 Two Intervals  
 Three Intervals

If 'Single Range' and 'One Interval' has been selected:

Capacity	999999
----------	--------

Single Range capacity entry  
 Example: 'Capacity 1500'

**For IT8000, IT8000Ex, IT8000Ex2/22 note:** In all input steps Clr-key must be pressed to delete old value before a new one can be entered.

Interval	999.999
----------	---------

Single Range scale interval entry (6 digits).  
 Example: 'Interval 0.5'  
 Valid scale intervals:  
 0.0001, 0.0002, 0.0005, 0.001, 0.002, 0.005, 0.01,  
 0.02, 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 50  
**Note:** An invalid entry is rejected with the error message 'Entry Not Valid'.

If 'Dual Range' or 'Two Intervals' or 'Two Intervals T+' has been selected:

**High Capacity 999999**

Entry of capacity of the highest scale range.  
Example: 'High Capacity 6000'

**High Interval 999.9999**

Entry of interval of the highest scale range.  
Example: 'High Interval 2'

**Note:** An invalid entry is rejected with the error message 'Entry Not Valid'.

**Low Capacity 999999**

Entry of capacity of the lowest range:  
Example: 'Low Capacity 3000'

**Note:** If the value for 'Low Capacity' is greater than that for 'High Capacity', the error message 'Entry Not Valid!' is shown.

**Low Interval 999.9999**

Entry of interval of the lowest scale range.  
Example: 'Low Interval 1'

**Note:** An invalid entry is rejected with the error message 'Entry Not Valid'.

The values for 'Low Interval' and 'High Interval' must not be identical, or the message 'Entry Not Valid' is shown.

If 'Triple Range' or 'Three Intervals' or 'Three Intervals T+' has been selected:

**High Capacity 999999**

Entry of capacity of the highest scale range  
Example: 'High Capacity 6000'

**High Interval 999.9999**

Entry of interval of the highest scale range  
Example: 'High Interval 2.0'

**Note:** An invalid entry is rejected with the error message 'Entry Not Valid'.

**Mid Capacity 999999**

Entry of capacity of the medium scale range  
Example: 'Mid Capacity 3000'

**Note:** If the value for 'Mid Capacity' is greater than that for 'High Capacity', the error message 'Entry Not Valid!' is shown.

**Mid Interval 999.9999**

Entry of interval of the medium scale range  
Example: 'Mid Interval 1.0'

**Note:** An invalid entry is rejected with the error message 'Entry Not Valid'.

**Low Capacity 999999**

Entry of capacity of the lowest scale range  
Example: 'Low Capacity 1500'

**Note:** If the value for 'Low Capacity' is greater than that for 'Mid Capacity', the error message 'Entry Not Valid!' is shown.

**Low Interval 999.9999**

Entry of interval of the lowest scale range  
Example: 'Low Interval 0.5'

**Note:** An invalid entry is rejected with the error message 'Entry Not Valid'.

Unit	kg	<input type="button" value="&lt;"/>	<input type="button" value="&gt;"/>	Select one of the following units: kg, g, t, lb
------	----	-------------------------------------	-------------------------------------	----------------------------------------------------

   Return to 'Select Group'

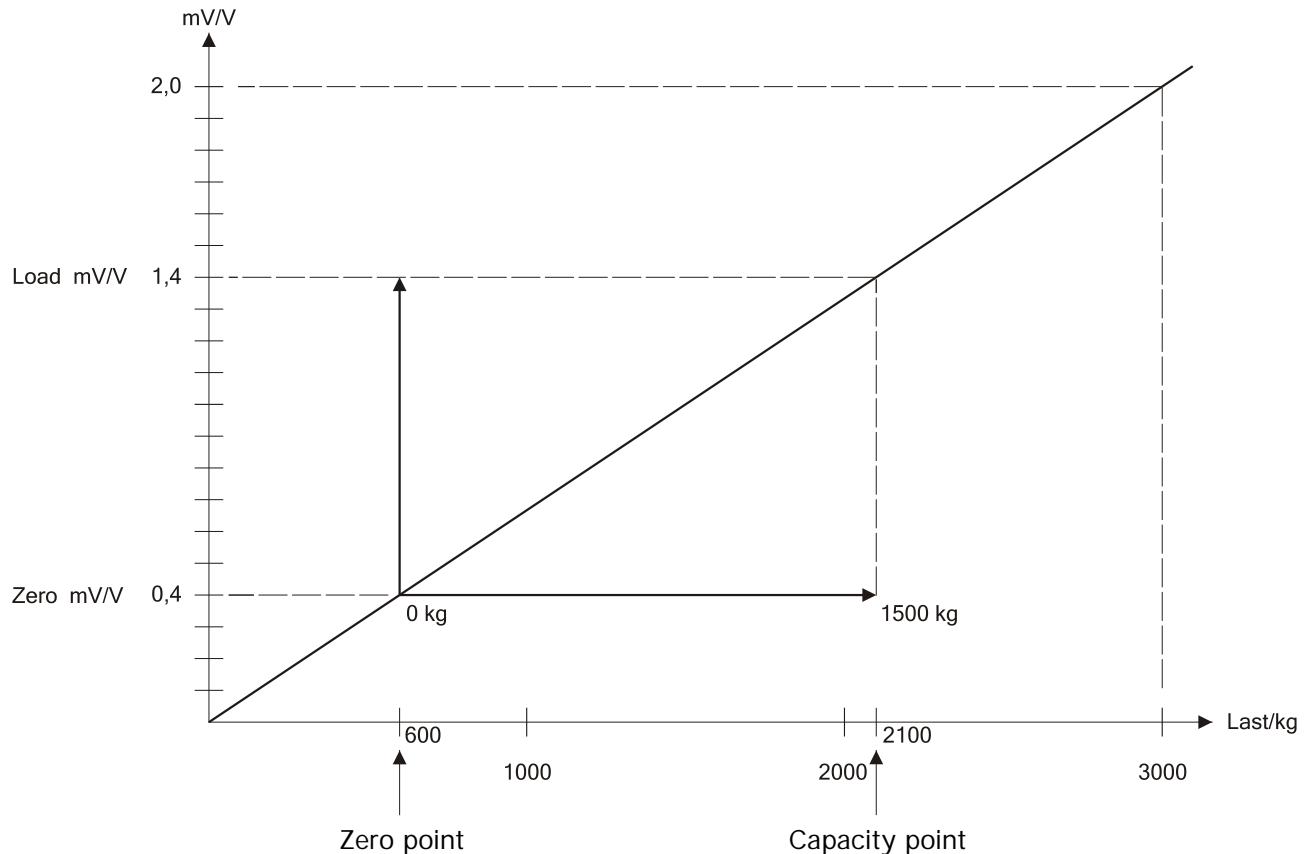
### 3.3 Calibration

The zero calibration and maximum load calibration are performed in this group. Instead of calibrating to maximum load, a calibration with partial load is also possible.

The Geo Value entry permits the calibration at one place even if the scale is to be operated at a different location. This compensates for the different forces of gravity without recalibration (not for W&M approved applications). By means of entering the rated signals (mV/V), a scale can also be precalibrated without test weights (see also chapter 'Precalibration').

Example for a calibration of a hopper scale:

- 3 loadcells with a capacity of 1000kg each with a sensitivity of 1,99995mV/V, 2,00005mV/V and 2,00000mV/V are used.
- The scale capacity is 1500kg with a division of 0.5kg.
- The weight of the empty hopper is 600kg.



<b>Select Group 1-9</b>	2 Calibration
<b>If linearization points already exist:</b>	
<b>Fixpoints active!</b>	One or more linearization points are already configured, these may affect calibration.
<b>Geo Value</b> 99	Entry of Geo Value. Enter the applicable Geo Value of the calibration location (see also chapter Geo Values).
<b>Calibrate Zero?</b> Y	<p>Scale Zero Calibration. Unload the scale and confirm to start the calibration.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <span>&lt;</span> <span>&gt;</span> <span>Info</span> </div> <p>Yes: Calibrate Zero No: Continue in step 'Zero(mV/V)'</p>
<b>Calibrating...</b>	Measuring Zero signal.
<b>Zero:</b> 0.00	Displays actual weight with tenfold resolution (for verification).
<b>Zero(mV/V):</b> 0.40000	<p>Display of rated signal See 'Calculate Span'. <b>Note:</b> The signal in millivolt can be obtained by multiplying the displayed mV/V value with the 'Excitation' (5V or 10V).</p>
<b>Notes:</b>	
<ul style="list-style-type: none"> <li>If applicable, press <b>Clr</b>-key to delete value and enter a new one.</li> <li>If Zero calibration parameters are to be stored <b>before</b> the Span calibration, the Setup must be exited at this point of the sequence. Answer question 'Save Parameters?' with 'Yes'. After that Group 2 can be selected again to proceed with calibration, Zero calibration can now be skipped.</li> </ul>	
<b>Calibrate Load?</b> Y	<p>Load calibration weight on scale. <b>Note:</b> For best results use the highest possible calibration load.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <span>&lt;</span> <span>&gt;</span> <span>Info</span> </div> <p>Yes: Calibrate Load No: Continue in step 'Load(mV/V)'</p>
<b>Calibr.Weight</b> 999999	Entry of calibration weight
<b>Clr</b>	Clear displayed default value and enter calibration weight.
<b>→</b>	Apply load and start calibration
<b>Calibrating...</b>	Measuring load signal.
<b>Load:</b> 9999999	Displays actual weight with tenfold resolution (for verification).

**Load (mV/V) :** 1.40000

Display of rated signal  
See 'Calculate Span'.

**Note:** The signal in millivolt can be obtained by multiplying the displayed mV/V value with the 'Excitation' (5V or 10V).

**Note:** If applicable, press **Clr -key** to delete value and enter a new one.

If the internal resolution is insufficient, the following error message is displayed:

**Resolution Error**

The internal resolution should be at least 10 times higher than the entered resolution.

Check calibration values and repeat calibration if required.

To store calibration parameters exit step 'Select Group' and answer question 'Save Parameters' with 'Yes'.

**Note:** If changes of calibration parameters are to be ignored, setup must be exited and question 'Save Parameters?' answered with 'No' before any other group of the calibration may be called up.

### 3.4 Linearization

Certain weighing inaccuracies are the result of the inherent non-linearity of the load sensor. Up to 6 linearization points can be set freely to compensate this imperfection. Linearization points should be entered at the points of the weighing curve where the greatest deviations (i.e. max. non-linearity) are experienced.

Linearization points must be smaller than the max. weighing range. The linearization algorithm interprets the sections between two neighboring linearization points as a straight line.

**Select Group 1-9**

**3 Linearization**

Linearization points already entered:

**Fixpoint 1:** 999999

Display of linearization points (1 - max. 6)

**Calibrate Fixpt?** N



**Lin.Signal** 0.50000



Display linearization signal



Delete existing linearization point

Clr-key pressed in previous step:

**Delete Fixpoint?** N



Yes: Delete linearization point



No: Do not delete linearization point



On Yes: Proceed to step 'New Fixpoint?'

On No: Continue with next linearization point

After deleting an existing fixpoint, the remaining ones are renumbered in rising order.

After display of the last linearization point or if there is no linearization point calibrated yet:

New Fixpoint 1? N	<input type="button" value="&lt;"/> <input type="button" value="&gt;"/>	Yes: Enter fixpoint No: Do not enter fixpoint
	<input type="button" value="Info"/>	On Yes: Continue On No: Return to 'Select Group'
Enter Fixp.1 9999999	Enter linearization weight	
Calibrate Fixpt.? N	<input type="button" value="&lt;"/> <input type="button" value="&gt;"/>	Yes: Calibrate fixpoint No: Entry of linearization signal
<b>If 'Calibrate Fixpt' = Yes</b> <b>Linearization..</b> Measuring the linearization signal.		
Weight: 9999999	Display actual weight with tenfold resolution (for verification).	
Lin.Signall 0.50000	Show linearization signal, this value can be accepted or cleared and overwritten, if required.	
	<input type="button" value="&lt;"/>	Continue in step 'New Fixpoint?'

A new fixpoint can be inserted between existing ones, after that all fixpoints are renumbered in rising order.

### 3.5 Zero Adjust

In this group the scale's Zero point is readjusted. This feature is useful if the calibration load was applied on an auxiliary test rig (e.g. for overhead track scales). After removing the test rig, the absolute Zero point can be adjusted.

Select Group 1-9	4 Zero Adjust
<b>If linearization points exist:</b> <b>Fixpoints active!</b> One or more linearization points are already configured, these may affect calibration.	
Unload Scale	Unload test rig or other loads
	<input type="button" value="&lt;"/> Start Zero Adjust
Adjusting...	Measuring the Zero signal.
Zero: 0.00	Displays of the new zero point with tenfold resolution (for verification).
Zero(mV/V): 0.50000	Display of rated signal See "Calculate Span"
	<input type="button" value="&lt;"/> Continue in step 'Select Group'

## 3.6 Adaptation

In this group parameters are entered to adapt the scale to its environment.

Select Group 1-9

5 Adaptation

Motion Window 0.5D



Info

Entry of Motion Window Size.

A stable weight is detected by the A/D converter (no motion) when the number of consecutive weight readings (interval specified in the next step) is within this window.

OFF: motion detector off

3.0D, 2.0D, 1.0D, 0.5D: Window size

Motion Counter 99

Interval for no-motion detection.

Specify the interval in units of 0,02 sec (20 msec) during which consecutive weight readings must fall into the range specified with motion window size.

Example: 20 = 0.4 sec interval.

Filter Size OFF



Info

Entry of Filter Strength (for digital weight filter).

Filter off: IT8000, IT8000Ex, IT8000Ex2/22:OFF, IT4000E, IT6000E(T), IT8000E(T), IT9000E = 0 1 to 20: light to strong filtering

Default setting: 11

If the scale is very unstable (e.g. livestock scale) a strong filtering is recommended.

**Note:** Filter Size can also be set in Service Mode (Group 1, after selecting scale driver ADM). Thus filtering can be adjusted after the scale has been stamped without breaking the seal.

The setting of the Filter Size in Service Mode overwrites the value entered during calibration with every start of the application program. To verify the valid setting, check value in Service Mode!

Auto Zero Range 0.5D



Info

Select range for Automatic Zero Adjust. (E.g. enter 0.5D for a range from - 0.5D to + 0.5D.)

Zero tracking is enabled within the selected range.

OFF: Disable Zero Adjust

0.5D, 1.0D, 3.0D: zero tracking range

PbZero (%) + 999

Select + range for Pushbutton Zero and Auto Zero Range above power up zero.

The scale can be set to Zero by pressing the Zero-key within the specified range.

Factory setting: 2%

PbZero (%) - 999

Select -range for Pushbutton Zero and Auto Zero Range below power up zero.

The scale can be set to Zero by pressing the Zero-key within the specified range.

Factory setting: 2%

PowerUp Zero +/- 10%	<input type="button" value="&lt;"/> <input type="button" value="&gt;"/>	Info	Select range for automatic Zero setting after power up. (E.g. enter 2% for a range from -2% to + 2% of the scale capacity).
----------------------	-------------------------------------------------------------------------	------	-----------------------------------------------------------------------------------------------------------------------------

After power up the scale will be automatically set to Zero if the weight is within the selected range.

OFF: Disable Power Up Zero

±2%, ±10%: range

Overload	999999	Select the threshold for display blanking. (E.g. enter 9 to set the limit to capacity + 9D).
----------	--------	----------------------------------------------------------------------------------------------

The scale display shows '-----' when the scale weight exceeds the selected limit.

Example: 'Overload 9'

(For multiple-range scales, 1d corresponds to the smallest weighing range.)

Incline Switch	OFF	<input type="button" value="&lt;"/> <input type="button" value="&gt;"/>	Info	Connection of incline sensor for mobile weighing on Inp.0 - Inp.7.
----------------	-----	-------------------------------------------------------------------------	------	--------------------------------------------------------------------

OFF no incline sensor

Inp.0 incline sensor connected on Inp.0 - 7

...

Inp.7

If an incline sensor is connected and the permissible inclination exceeded, the display of the indicator is blanked. Instead of the weight only a slash '/' is shown.

NTEP approval?	N	1/Y 0/N	Set measuring parameters compliant to US regulations (National Type Evaluation Program) in accordance with Handbook 44.
----------------	---	------------	-------------------------------------------------------------------------------------------------------------------------

N Disabled (default)

Y Enabled

**Note:** Must be set to Y(es) for all applications in US, Canada and Australia!

Underload 20d?	Y	1/Y 0/N	Display blanking for gross weights smaller than -20d (under zero):
----------------	---	------------	--------------------------------------------------------------------

N Disabled

Y Enabled (default)

For applications compliant to OIML R76 underload blanking must be enabled.

With Taring ?	Y	1/Y 0/N	Enable / disable tare functions:
---------------	---	------------	----------------------------------

N: Tare functions disabled

Y: Tare functions enabled (default)

For scales working only in gross mode, the tare functions can be disabled to avoid the tests of the tared scale during W&M verification.

Only IT4000E, IT6000E (T), IT8000E (T), IT9000E

Onscreen typeplate? Y	1/Y 0/N	Enable / disable the display of the 'Electronic marking plate' above the weight display:
-----------------------	------------	------------------------------------------------------------------------------------------

Y: Marking plate is shown

N Field is blanked.

Update Rate	225
-------------	-----

Choose update rate of digital filter:

Range: 50 ... 800 Hz

Default setting: 225 Hz.

If vibrations are experienced at the place of installation, the setting of the digital filter can be optimized. The update rate should be chosen to differ as much as possible from the frequency of the vibration and its harmonics.



Return to 'Select Group'

### 3.7 High Resolution

In this group the weight is shown with tenfold resolution. Use this group to check the scale accuracy.

Select Group 1-9
------------------

6 High Resolution

Weight: 9999999
-----------------

Displays the actual weight with tenfold resolution (for information only).

9999999 kg
------------

Info Displays the actual weight and unit

Counts: 9999999
-----------------

Info Display of Raw Counts

Signal mV/V: 9999999
----------------------

Info Display of rated signal

Weight: 9999999
-----------------



Return to 'Select Group'

### 3.8 Reset Parameters

In this group the scale parameters can be reset to default values. After resetting the parameters the scale must be reconfigured.

Select Group 1-9	7	Reset Parameters
Reset Parameters? N	<input type="button" value="&lt;"/> <input type="button" value="&gt;"/>	No: Do not reset parameters Yes: Reset parameters (see table)
Info		

Factory Settings:

Group	Parameter	Factory Setting	Your Calibration
1 (Scale Parameters)	Single/Dual/Triple Range	Single Range	
	Capacity	3000	
	Interval	1	
	Unit	kg	
2 (Calibration)	Geo Value	20	
	Zero (mV/V) W1	0.00000	
	Load (mV/V) W1	2.00000	
	Zero (mV/V) W2	0.00000	
	Load (mV/V) W2	2.00000	
5 (Adaptation)	Motion Window	0.5D	
	Motion Count(er)	20	
	Filter Size	11	
	Auto Zero Range	0.5D	
	Pushbutton Zero (+)	2%	
	Pushbutton Zero (-)	2%	
	Power Up Zero	OFF	
	Overload	9D	
	Incline Switch	OFF	
	NTEP (IT8000, IT8000Ex)	N	
	Underload 20d	Y	
	With Taring	Y	
8 (Calculate Span)	Update Rate	225	
	Zero (mV/V)	0.00000	
	LC-Capacity	0	
	No.Of LCs	1	
	mV/V Of LC1	2.00000	

### 3.9 Calculate Span

When the rated output signal of a scale's loadcell(s) is known, calibration can be made without test weights. This information is available, for instance, for loadcell types D1, C2 and C3 OIML, for which test reports are issued by the manufacturer stating the rated output in mV/V.

A prerequisite is that the unloaded scale can be calibrated at zero, which is usually the case.

Example for a theoretical calibration of a hopper scale:

- 3 loadcells with a capacity of 1000kg each with a sensitivity of 1,99995mV/V, 2,00005mV/V and 2,00000mV/V are used.
- The scale capacity is 1500kg with a division of 0.5kg.
- The weight of the empty hopper is 600kg.

Select Group 1-9	8      Calculate Span
Calibrate Zero? Y	Scale Zero Calibration. Unload the scale and confirm to start the calibration.
	<input type="button" value="&lt;"/> <input type="button" value="&gt;"/> Yes: Calibrate Zero <input type="button" value="Info"/> No: Continue in step 'Zero(mV/V)'
Calibrating...	Measuring Zero signal.
Zero: 0.00	Displays actual weight with tenfold resolution (for verification).
Zero(mV/V): 0.40000	Display of rated signal (20% dead load = 20% signal)
LC-Capacity 1000	Enter nominal capacity of one loadcell, in unit as chosen in Group 1 (Scale Parameters\Unit)
No. Of LCs 3	Enter number of connected loadcells: IT4000E, IT6000E(T), IT8000E(T), IT8000, IT9000E: max. 16; IT8000Ex: max. 4
mV/V of LC1 1.99995	Enter rated signal of first loadcell. Continue with next loadcell, after the last loadcell continue in the next step.
Load(mV/V): 1.40000	Display of the calculated rated signal at full load. (20% dead load + 50% net load)
	<input type="button" value="↶"/> Return to 'Select Group'

Note: Value can be deleted with Clr-key to enter new one.

### 3.10 W&M Info

In this group the setting of parameters can be checked that are relevant for W&M approved scales. Any deviation is indicated.

Select Group 1-9	9	W&M Info
------------------	---	----------

Check parameters for W&M approved scales (permissible values in brackets):

Motion Window	(0.5d)
Motion Counter	( <sup>3</sup> 7)
Autozero Range	(0.5d)
Pushbutton Range	(£4%)
Overload	(max. 9d)

If all settings comply with W&M regulations a corresponding message is displayed:

W&M Setup ok
--------------

If settings do not comply with W&M regulations a corresponding message is displayed, example:

Error: Overload > 9d	Value for overload blanking is set to a value greater than 9d.
----------------------	----------------------------------------------------------------

<input type="button" value=""/>	Continue
---------------------------------	----------

### 3.11 Factory Calibration

The A/D converter of the weighing terminal stores the calibration parameters in a powerfail safe EEPROM.

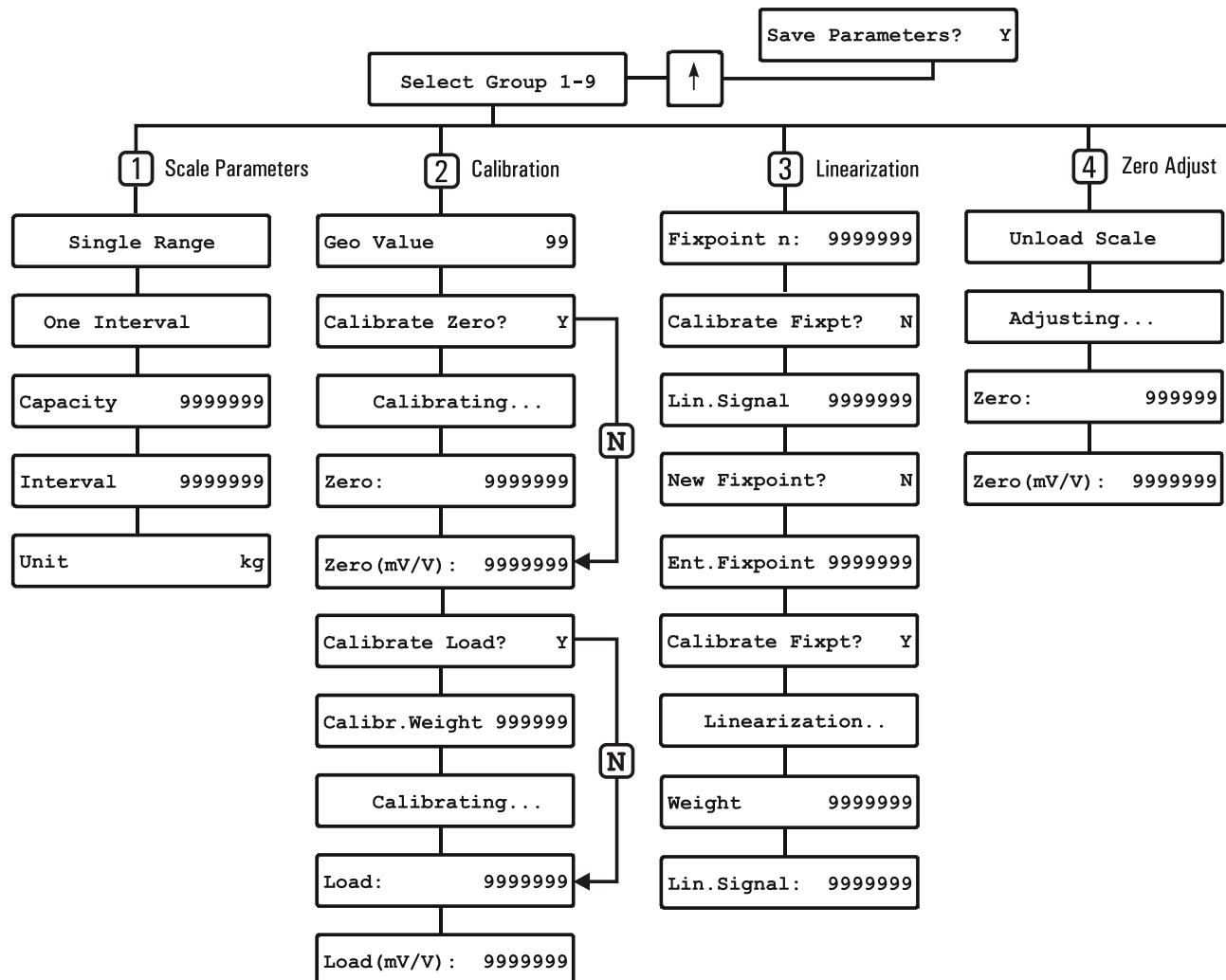
During testing and checkout of a weighing terminal, the A/D converter is factory calibrated. I.e. correction factors (Gain and Offset) are measured by means of precision simulators and stored to equalize the different amplification values of the individual A/D boards.

When a scale is calibrated, the rated values (mV/V) are measured for Zero (preload) and Load (preload plus weighing range). Due to the factory pre-calibration (and resulting near-identical amplification), these rated values can be transferred from one A/D board to another one, if there is a need to do so, e.g. in the event of a break down to minimize down time. However, it is strongly recommended to check the accuracy of the scale with test weights as soon as possible. Recalibration with certified test weights is mandatory for scales that are subject to Weights & Measures approval.

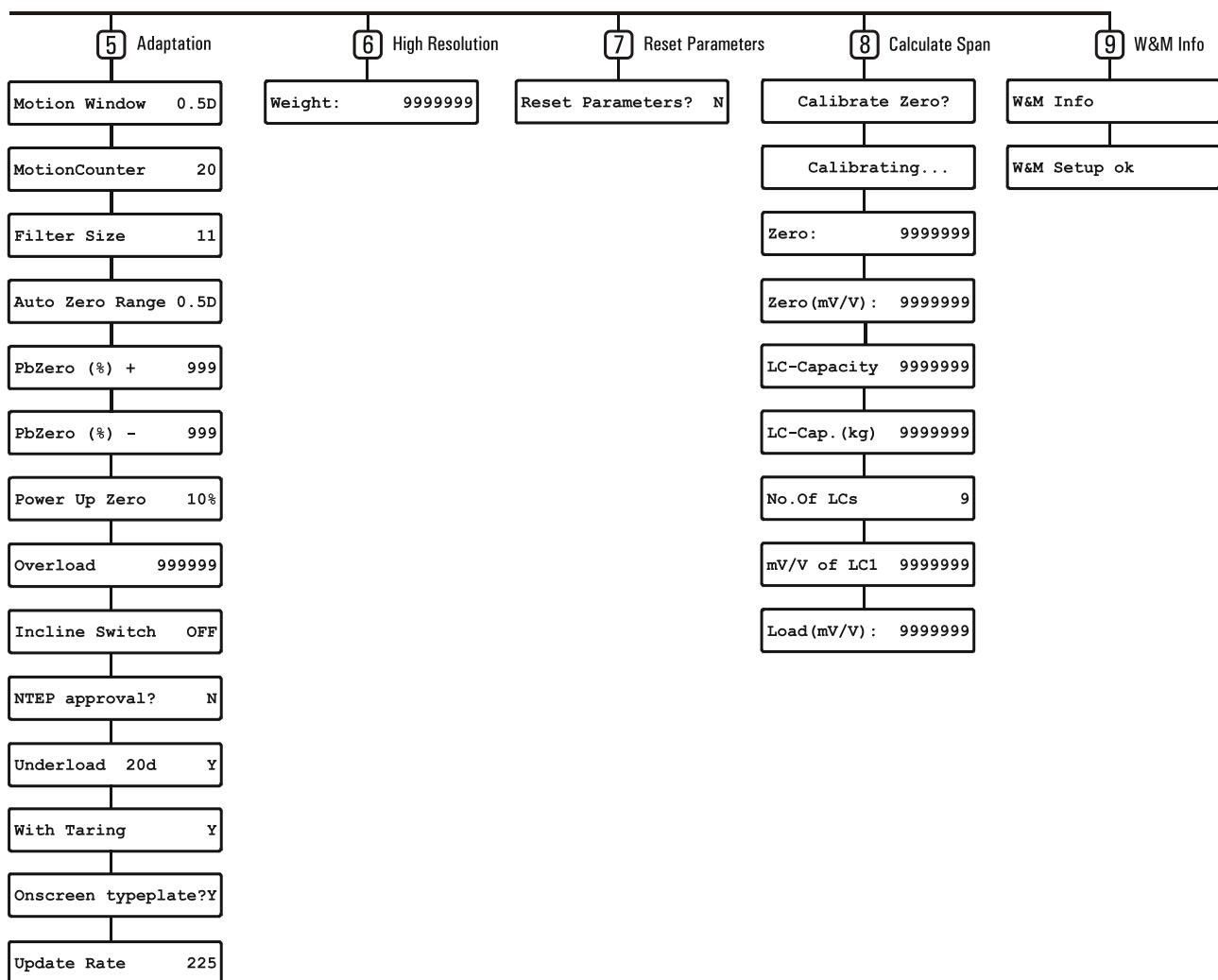
Entry of rated values is made in Calibration Mode, Group 2, in the steps 'Zero(mV/V)' and 'Load(mV/V)'.

### 3.12 Overview Calibration Mode

Part 1:



## Part 2:



## 4 Mastermode

The Mastermode allows to inspect the zero offset and to modify the Adapt-Mode parameters.

### 4.1 Info Zero-Offset

Mastermode : Info

Zero-Offset : 999

Display of the zero offset relative to the calibrated zero value, it is shown in the calibrated unit in X10 representation.

### 4.2 Adapt Mode

The Adapt Mode provides options to optimize the digital filtering of the captured weight:

#### 4.2.1 IT3000M Access From Weighing Mode

W1 15,00kg NET Example for weight display in initial step

F8 Call up entries (Supervisor Mode)

Sel: Parameter

Sel: Mastermode

Mastermode : Info

Mastermode : Adapt  Continue in section 'Adapt Mode Parameter'

#### 4.2.2 IT4000E/IT6000E/IT8000E Access From Weighing Mode

and

Mastermode : Info

Mastermode : Adapt  Continue in section 'Adapt Mode Parameter'

#### 4.2.3 IT9000E Access From Weighing Mode

and

Mastermode : Info

Mastermode : Adapt  Continue in section 'Adapt Mode Parameter'

#### 4.2.4 IT6000ET, IT8000ET Access From Weighing Mode

Press 'Display switching key' until 'Firmware Information' appears.



Press key 'Mastermode'.



Mastermode entries are made in the Info-line.



**Mastermode:** Info

**Mastermode:** Adapt  Continue in section 'Adapt Mode Parameter'

#### 4.2.5 IT3000M, IT4000E, IT6000E(T), IT8000E(T), IT9000E Access From Service Mode

Service: Calibration

Calibrate Scale 1

F2

Mastermode: Info > IT3000M: Info

Mastermode: Adapt - Continue in section 'Adapt Mode Parameter'

#### 4.2.6 IT8000, IT8000Ex, IT8000Ex2/22 Access From Service Mode

Service Mode  
Select Group 1-7

1 Interface configuration

Interfaces  
Scale 1 ADC

F1 Continue in section 'Adapt Mode Parameter'

#### 4.2.7 Adapt Mode Parameter

Damping	0	<input type="button" value="&lt;"/> <input type="button" value="&gt;"/>	Damping
		Info	With this parameter the 'Filter Size' as set in the calibration can be changed by up to + 5 or -5 steps. Default setting is 0.
-5 to + 5: Adaptation of filter size			

Not for IT8000, IT8000Ex, IT8000 Ex2/22:

Type	Standard	<input type="button" value="&lt;"/> <input type="button" value="&gt;"/>	Filter characteristic
		Info	Choose characteristic of digital filter:
Standard			
Critically Damped			
Butterworth			
Bessel			

Only for 'Critically Damped, Butterworth, Bessel'

Passes	2	Order of filter
		Choose order of filter, valid range:
		1 - 20

Vib. Filter	DOSING	<input type="button" value="&lt;"/> <input type="button" value="&gt;"/>	Filter type
		Info	Choose the filter type for the application. 'DOSING' is optimized for filling applications when changes of the load must be processed without delay. 'WEIGHING' is better suited for static weighing when fast changes of the weight must be captured, but small deviations - such as vibrations- must be filtered.
DOSING      Optimized for filling			
WEIGHING      Optimized for static weighing			

Vib. Size	1	<input type="button" value="&lt;"/> <input type="button" value="&gt;"/>	Working window of vibration filter
		Info	If extreme vibrations are experienced, this parameter serves to adapt the working window of the vibration filter. Default setting is 1.
Caution! Do not increase this setting unless a stable display could not be reached with the Adapt Mode parameter 'Damping' and the Calibration Mode parameters 'Filter Size' and 'Update Rate'.			
1 to 8: Increase working window			

## 4.3 Calibration Mode SUMMING

Only for IT8000, IT8000E(T), IT8000E Ex2/22, IT8000Ex2/22, IT9000E.

### 4.3.1 Select Group

**Passwort** **????** Enter service password



**Select Group 1-3** **< >** Select parameter group:  
**Info**

- 1 Summing Parameters
- 2 Adaptation
- 3 Reset Parameters

In groups 1 – 3 the summing scale parameters are entered as described below. After setting the parameters and pressing the - key in step 'Select Group' the display shows:

**Save Parameters?** **Y** **< >** Yes: Save parameters  
**Info** No: Ignore changes and exit

### 4.3.2 Summing Parameters

In this group the summing function can be activated and the summing parameters entered.

**Select Group 1-3** **1** Summing Parameters

**Summing Scale** **OFF** **< >** OFF: Summing Scale disabled  
**Info** ON: Summing Scale enabled

**Sum Capacity** **999999** Enter the Summing Scale capacity.  
Example: 'Sum Capacity 60000'

**Sum Interval** **999.999** Enter the Summing Scale interval.  
Example: 'Sum Interval 20'

Valid scale intervals:  
0.0001, 0.0002, 0.0005, 0.001, 0.002, 0.005, 0.01,  
0.02, 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 50, 100,  
200

**Note:** An invalid entry is rejected with the error message 'Entry Not Valid'.

#### 4.3.3 Summing Adaptation

In this group overload for the summing scale is set.

Select Group 1-3

2 Summing Adaptation

Sum Overload 999999

Select the threshold for display blanking. (E.g. enter 9 to set the threshold to sum capacity + 9D).

The scale display shows '-----' when the summing scale weight exceeds the selected threshold.

Example: 'Overload 9'

Sum Grossmode N

When 'gross mode' is chosen, the summing scale only works in this mode, taring is disabled.

**Note:** Only required in Australia, not for EC countries.

#### 4.3.4 Reset Summing Parameters

In this group the scale parameters of the summing scale can be set to default values.

Select Group 1-3

3 Reset Parameters

Reset Parameters? N

< >  
Info

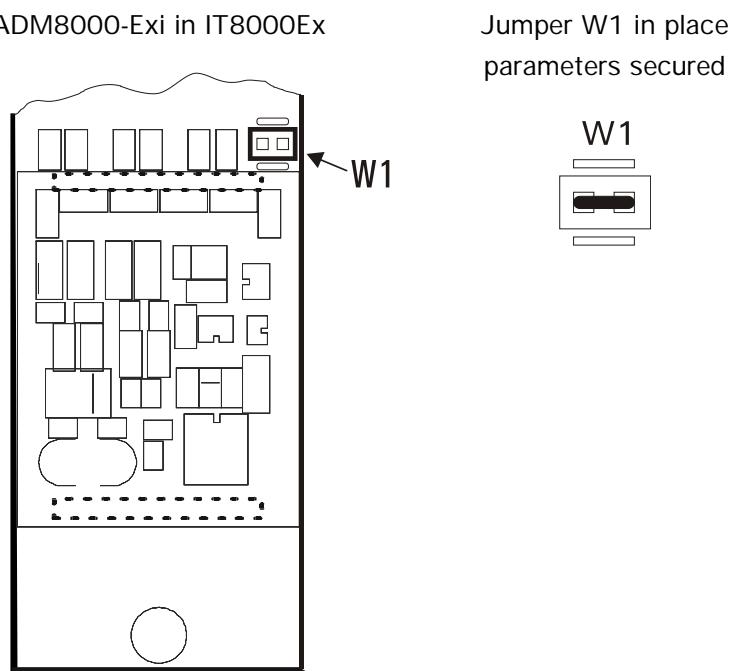
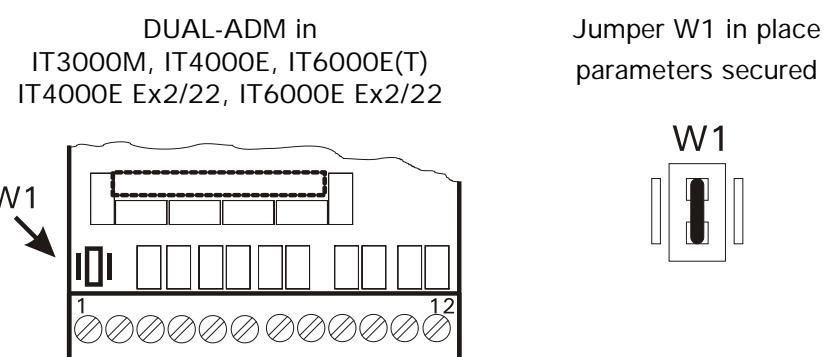
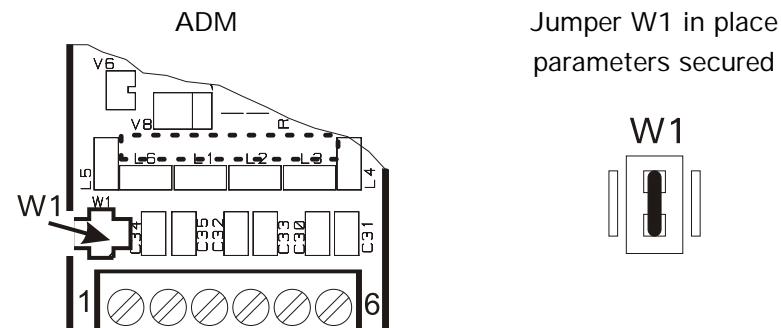
No: Do not reset parameters  
Yes: Reset parameters (see table)

#### Factory Settings:

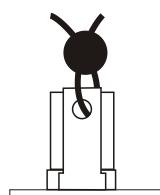
Group	Parameter	Factory Setting	Your Calibration
1 (Scale Parameters)	Summing Scale	OFF	
	Summing Capacity	-	
	Summing Interval	1	
2 (Adaptation)	Overload	9	
	Sum Grossmode	N	

## 5 Securing Scale Parameters

The scale parameters are stored in EEPROM memory and secured by setting the jumper W1.



W&M approved applications require that the calibration parameters be protected against unauthorized modifications. To that effect the jumper can be sealed with thread and lead seal.



## 6 Geo Values

Examples for Geo Values by country:

Country	Geo Value
France	20
Finland	24
Belgium	21
Denmark	23
Germany	20
Great Britain	21
Ireland	22
Norway	24
Netherland	21
Austria	19
Switzerland	18
Sweden	24
Spain	15

Table of Geo Values

Northern or southern terrestrial latitude in degrees and minutes				Height above sea level (in meters)											
				0 325	325 650	650 975	975 1300	1300 1625	1625 1950	1950 2275	2275 2600	2600 2925	2925 3250	3250 3575	
				Height above sea level (in feet)											
0°	0'	-	5° 46'	5	4	4	3	3	2	2	1	1	0	0	0
5°	46'	-	9° 52'	5	5	4	4	3	3	2	2	1	1	0	0
9°	52'	-	12° 44'	6	5	5	4	4	3	3	2	2	1	1	1
12°	44'	-	15° 6'	6	6	5	5	4	4	3	3	2	2	1	1
15°	6'	-	17° 10'	7	6	6	5	5	4	4	3	3	2	2	2
17°	10'	-	19° 2'	7	7	6	6	5	5	4	4	3	3	2	2
19°	2'	-	20° 45'	8	7	7	6	6	5	5	4	4	3	3	3
20°	45'	-	22° 22'	8	8	7	7	6	6	5	5	4	4	3	3
22°	22'	-	23° 54'	9	8	8	7	7	6	6	5	5	4	4	4
23°	54'	-	25° 21'	9	9	8	8	7	7	6	6	5	5	4	4
25°	21'	-	26° 45'	10	9	9	8	8	7	7	6	6	5	5	5
26°	45'	-	28° 6'	10	10	9	9	8	8	7	7	6	6	5	5
28°	6'	-	29° 25'	11	10	10	9	9	8	8	7	7	6	6	6
29°	25'	-	30° 41'	11	11	10	10	9	9	8	8	7	7	6	6
30°	41'	-	31° 56'	12	11	11	10	10	9	9	8	8	7	7	7
31°	56'	-	33° 9'	12	12	11	11	10	10	9	9	8	8	7	7
33°	9'	-	34° 21'	13	12	12	11	11	10	10	9	9	8	8	8
34°	21'	-	35° 31'	13	13	12	12	11	11	10	10	9	9	8	8
35°	31'	-	36° 41'	14	13	13	12	12	11	11	10	10	9	9	9
36°	41'	-	37° 50'	14	14	13	13	12	12	11	11	10	10	9	9
37°	50'	-	38° 58'	15	14	14	13	13	12	12	11	11	10	10	10
38°	58'	-	40° 5'	15	15	14	14	13	13	12	12	11	11	10	10
40°	5'	-	41° 12'	16	15	15	14	14	13	13	12	12	11	11	11
41°	12'	-	42° 19'	16	16	15	15	14	14	13	13	12	12	11	11
42°	19'	-	43° 26'	17	16	16	15	15	14	14	13	13	12	12	12
43°	26'	-	44° 32'	17	17	16	16	15	15	14	14	13	13	12	12
44°	32'	-	45° 38'	18	17	17	16	16	15	15	14	14	13	13	13
45°	38'	-	46° 45'	18	18	17	17	16	16	15	15	14	14	13	13
46°	45'	-	47° 51'	19	18	18	17	17	16	16	15	15	14	14	14
47°	51'	-	48° 58'	19	19	18	18	17	17	16	16	15	15	14	14
48°	58'	-	50° 6'	20	19	19	18	18	17	17	16	16	15	15	15
50°	6'	-	51° 13'	20	20	19	19	18	18	17	17	16	16	15	15
51°	13'	-	52° 22'	21	20	20	19	19	18	18	17	17	16	16	16
52°	22'	-	53° 31'	21	21	20	20	19	19	18	18	17	17	16	16
53°	31'	-	54° 41'	22	21	21	20	20	19	19	19	18	18	17	17
54°	41'	-	55° 52'	22	22	21	21	20	20	19	19	18	18	17	17
55°	52'	-	57° 4'	23	22	22	21	21	20	20	19	19	18	18	18
57°	4'	-	58° 17'	23	23	22	22	21	21	20	20	19	19	18	18
58°	17'	-	59° 32'	24	23	23	22	22	21	21	21	20	20	19	19
59°	32'	-	60° 49'	24	24	23	23	22	22	21	21	20	20	19	19
60°	49'	-	62° 9'	25	24	24	23	23	22	22	21	21	20	20	20
62°	9'	-	63° 30'	25	25	24	24	23	23	22	22	21	21	20	20
63°	30'	-	64° 55'	26	25	25	24	24	23	23	22	22	21	21	21
64°	55'	-	66° 24'	26	26	25	25	24	24	23	23	22	22	21	21
66°	24'	-	67° 57'	27	26	26	25	25	24	24	23	23	22	22	22
67°	57'	-	69° 35'	27	27	26	26	25	25	24	24	23	23	22	22
69°	35'	-	71° 21'	28	27	27	26	26	25	25	24	24	23	23	23
71°	21'	-	73° 16'	28	28	27	27	26	26	25	25	24	24	23	23
73°	16'	-	75° 24'	29	28	28	27	27	26	26	25	25	24	24	24
75°	24'	-	77° 52'	29	29	28	28	27	27	26	26	25	25	24	24
77°	52'	-	80° 56'	30	29	29	28	28	27	27	26	26	25	25	25
80°	56'	-	85° 45'	30	30	29	29	28	28	27	27	26	26	25	25
85°	45'	-	90° 0'	31	30	30	29	29	28	28	27	27	26	26	26

## 7 Error Messages

If an error occurs during calibration or normal operation, error messages are displayed as follows:

Error Message	Possible Cause	Corrective Measure
ADM defect	<ul style="list-style-type: none"> <li>· No data received from A/D converter</li> </ul>	<ul style="list-style-type: none"> <li>· Replace A/D converter</li> </ul>
ADM Timeout	<ul style="list-style-type: none"> <li>· Short circuit in L/C cable</li> <li>· EMC interference</li> </ul>	<ul style="list-style-type: none"> <li>· Check cabling</li> <li>· Check cabling</li> </ul>
ADM not Factory cal.	<ul style="list-style-type: none"> <li>· Calibration error</li> </ul>	<ul style="list-style-type: none"> <li>· Repeat calibration</li> </ul>
Invalid Setupdata	<ul style="list-style-type: none"> <li>· ADM is defective</li> </ul>	<ul style="list-style-type: none"> <li>· Replace ADM</li> </ul>
ADM not installed	<ul style="list-style-type: none"> <li>· ADM not installed</li> <li>· ADM not correctly plugged in</li> </ul>	<ul style="list-style-type: none"> <li>· Install ADM</li> <li>· Plug in ADM correctly</li> </ul>
Calibration Locked	<ul style="list-style-type: none"> <li>· Jumper for protection of calibration parameters in position 'protected'</li> </ul>	<ul style="list-style-type: none"> <li>· Remove calibration jumper</li> </ul>
Error Calibr. Jumper		
I/O Error	<ul style="list-style-type: none"> <li>· Interface error</li> </ul>	<ul style="list-style-type: none"> <li>· Check interface and replace module if required</li> </ul>
Incline Sensor	<ul style="list-style-type: none"> <li>Incline sensor signals error</li> <li>· Inclination too big</li> <li>· Inclination is defective</li> </ul>	<ul style="list-style-type: none"> <li>· Reduce inclination</li> <li>· Replace inclination sensor</li> </ul>
Not available	<ul style="list-style-type: none"> <li>No scale selected</li> </ul>	<ul style="list-style-type: none"> <li>· Enable scale in Service Mode</li> </ul>
Out of Range	<p>A/D converter out of range, because:</p> <ul style="list-style-type: none"> <li>· Wiring error in L/C connection</li> <li>· L/C defective</li> <li>· Scale heavily overloaded</li> </ul>	<ul style="list-style-type: none"> <li>· Check cabling and signal: ~ 0 – 10mVAC (signal) and excitation voltage: ~ 5VAC</li> <li>· Check L/C</li> <li>· Unload scale</li> </ul>

Error Message	Possible Cause	Corrective Measure
O v e r l o a d -----	<ul style="list-style-type: none"> <li>Scale in overload</li> <li>Zero setting or taring cannot be carried out because scale is in motion</li> <li>CPU does not receive data from scale interface</li> </ul>	<ul style="list-style-type: none"> <li>Unload scale</li> <li>Settle scale</li> <li>Check external and internal cabling</li> </ul>
U n d e r l o a d	Gross weight smaller than -20d (below zero)	<ul style="list-style-type: none"> <li>Load scale</li> <li>Set parameter 'Underload 20d' to N= disabled</li> </ul>
W1      Plug In	No data from scale interface	<ul style="list-style-type: none"> <li>Check internal and external cabling</li> </ul>
Powerup Out of Range	Error power up zero. This message appears on power up if the weight on the scale exceeds the power up zero range as set in the calibration ( $\pm 2\%$ , $\pm 10\%$ ).	<ul style="list-style-type: none"> <li>Unload scale</li> </ul>
Not In Zerorange		
Resolution Error	Internal resolution too small, must be at least tenfold the displayed resolution	<ul style="list-style-type: none"> <li>Select bigger increment size</li> <li>Use L/C with lower capacity</li> </ul>
Servicemode active	Device is set up as 'Remote Terminal' and Service Mode is active in the master terminal	<ul style="list-style-type: none"> <li>Terminate Service Mode in the master terminal</li> </ul>

## 7.1 Error Log Of Scale

Calibrate Scale 1	F1	View error log of scale
-------------------	----	-------------------------

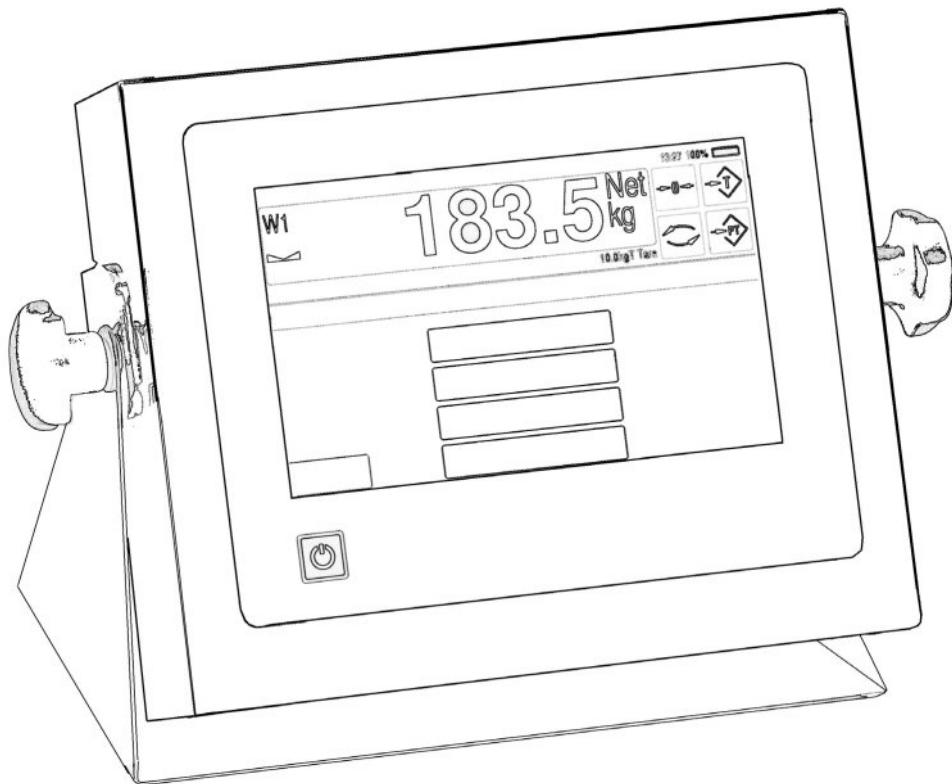
06.06.12 08:52	Ok
----------------	----

Date, time and error code of event are shown.

Code	Event
Ok	Ok
Over	Overload
Under	Underload
Range	Out of range
Miss.	Not installed
Incl.	Incline sensor
PUOvr	Powerup out of range
PUUdr	Powerup motion
Invalid	Not calibrated
IOErr	I/O error
Not I	Not installed
NotOk	Not ok
E32	Other error message 32

## Technical Manual

# IT8000ET



Industrial Weighing Terminal  
With Touch Screen

February 2017

ST.2309.1472

Rev. 14



## **Technical Manual IT8000ET**

Date: February 08, 2017  
File: IT8000ET\_THE.DOC  
Program Version: as of firmware 'V4\_I6\_20170110.IT468E'

**This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:  
(1) this device may not cause harmful interference, and (2) this device must accept any interference  
received, including interference that may cause undesired operation.**

**Published By:**

© SysTec Systemtechnik und Industrieautomation GmbH, Bergheim, Germany

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, mechanical, photocopying, recording, or otherwise, without the prior written permission of SysTec GmbH.

Terms and product names mentioned in this publication are trademarks, registered trademarks or service marks of their respective owners. Use of a term should not be regarded as affecting the validity of any trademark, registered trademark or service mark.

TOLEDO® and DigiTOL® are registered trademarks of Mettler-Toledo Inc.

**Please Note:**

While every precaution has been taken in the preparation of this manual, SysTec GmbH assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein.

The publisher is grateful for any information and/or advice that may contribute to correct errors or omissions in following editions.

## Contents

<b>1 Introduction .....</b>	<b>7</b>
1.1 Safety Symbols Used In This Manual .....	7
1.2 General Safety Advice .....	7
1.3 Précautions d'emploi (ETL) .....	9
1.4 Declaration Of Conformity (US).....	10
<b>2 System Description .....</b>	<b>11</b>
<b>3 Installation.....</b>	<b>12</b>
3.1 Safety Advice .....	12
3.2 Setup Of The Instrument.....	12
3.3 Connection Of Cables.....	13
3.4 Connection Overview .....	14
3.5 Connection Of Scales .....	15
3.6 Connection Of Serial Interfaces (SIM And DUAL-ISM) .....	23
3.7 Connection Of Single-/Dual-Channel Pulse Wheel (DUAL-ISM) .....	28
3.8 USB Connection .....	28
3.9 Ethernet Connection.....	29
3.10 Connection Of WLAN Module WLX .....	30
3.11 Connection Of Digital I/Os PIM.....	31
3.12 Connection Of 15-Bit Analog Output (DAU15) .....	34
3.13 Connection Of 15-Bit Analog Input ADI .....	36
3.14 Connection Of Ethernet/IP-Module ETX .....	38
3.15 Connection Of PROFINET Module PNX .....	41
3.16 Connection Of PROFINET Module PNU .....	44
3.17 Connection Of Profibus Module PBX .....	48
3.18 Connection Of Profibus Module PBU .....	50
3.19 Connection To Power Supply 12–30 VDC .....	52
3.20 Enable On/Off Switch .....	52
3.21 ITX000ET External Power Supply 110–240 VAC (T8PWS001) .....	53
<b>4 Weight Display And Scale Function Keys .....</b>	<b>54</b>
4.1 General Operation .....	56
4.2 Operation Of Scale Functions .....	57
<b>5 Service Mode .....</b>	<b>58</b>
5.1 General .....	58
5.2 Access To Service Mode.....	58
5.3 Overview Service Mode .....	60
<b>6 Configuration .....</b>	<b>61</b>
6.1 Configure Scale .....	61
6.2 Configure Digital I/Os .....	63
6.3 Configure Analog Outputs .....	63
6.4 Configure Analog Inputs .....	65
6.5 Configure Fieldbus Module .....	66
<b>7 Calibration Mode .....</b>	<b>67</b>
<b>8 Entry Of Parameters (General) .....</b>	<b>68</b>
<b>9 Interface Configuration .....</b>	<b>72</b>
9.1 Configuration of Ethernet interface .....	72

9.2 Configuration of serial interfaces .....	73
9.3 Configuration for PC <i>ReadIT</i> .....	75
<b>10 Network .....</b>	<b>77</b>
<b>11 WLAN .....</b>	<b>78</b>
<b>12 Licenses .....</b>	<b>79</b>
<b>13 Backup .....</b>	<b>80</b>
13.1 Backup data .....	80
13.2 Restore data .....	80
<b>14 Test .....</b>	<b>81</b>
14.1 Test Of Digital Inputs/Outputs .....	81
14.2 Test Of Serial Interfaces .....	82
<b>15 Reset .....</b>	<b>83</b>
15.1 Reset Parameters .....	83
15.2 Reset Approved Weight.....	84
<b>16 Data Archive .....</b>	<b>85</b>
<b>17 Continuous Output (Cont.out) .....</b>	<b>86</b>
17.1 SysTec Standard Protocol.....	86
17.2 SysTec Remote Protocol.....	86
17.3 Customized Protocol .....	87
17.4 CAS Protocol.....	89
17.5 Flintec Protocol .....	89
17.6 GS Protocol (Gebhardt & Schäfer With Traffic Light Function).....	90
17.7 MT-SICS Protocol .....	90
17.8 Schauf Protocol.....	91
17.9 SPEC1 Protocol .....	91
17.10 SPEC2 Protocol .....	92
17.11 TOLEDO® Protocol .....	93
<b>18 Transport, Maintenance And Cleaning .....</b>	<b>94</b>
18.1 Transport .....	94
18.2 Maintenance.....	94
18.3 Cleaning.....	94
18.4 Replacing The Battery .....	95
18.5 Calibration Of Display .....	96
<b>19 Trouble Shooting.....</b>	<b>97</b>
19.1 Error Log Of Scale .....	98
19.2 Error Messages .....	99
<b>20 Technical Data.....</b>	<b>101</b>
20.1 IT8000ET .....	101
20.2 ITX000ET External Power Supply Unit.....	102
<b>21 Dimensions .....</b>	<b>103</b>
21.1 IT8000ET .....	103
21.2 ITX000ET External Power Supply Unit.....	104
<b>22 Service Password.....</b>	<b>105</b>

## 1 Introduction

IT8000ET is a universal industrial weighing terminal for weighing and data capture applications. A touch sensitive 7" TFT color display is used for operation and indication of weight and additional information. This manual contains information and Technical Data for installation and operation of the IT8000ET weighing terminal and the optional power supply unit 'ITX000ET Externes Netzteil' (external power supply).

Further information is provided in the following manuals:

- ADM / DUAL-ADM / ADM8000-Exi Calibration Manual, order No.: ST.2309.0688
- Flintec / HBM Calibration Manual, order No.: ST.2309.1568
- MultiRange Calibration Manual, order No.: ST.2309.0057
- WLX Installation Instructions, order No.: ST.2309.1590
- Web Interface Operation Manual, order No.: ST.2309.1692
- PC ScaleView Operation Manual, order No.: ST.2309.1816

### 1.1 Safety Symbols Used In This Manual

Safety relevant information is shown with corresponding symbols as follows:



#### W A R N I N G

Failure to observe this precaution could result in serious injuries or fatal accidents. Please make absolutely sure that these precautions are observed in order to ensure safe operation of the equipment.



#### CAUTION

- Failure to observe this precaution could result in damage to or destruction of the equipment or bodily harm! Please make absolutely sure that these precautions are observed in order to ensure safe operation of the equipment.

**Note:** This indicates an advice for the designated use of the equipment and/or additional information to avoid inappropriate handling.

### 1.2 General Safety Advice



#### W A R N I N G

Exercise utmost care when making checks, tests and adjustments that can actuate movable parts such as feeding devices, gates, flaps, conveyors, etc. Make absolutely sure that nobody is within reach of movable parts.

Failure to observe this precaution could result in bodily injury!



#### W A R N I N G

This unit must not be operated in a potentially explosive atmosphere!

It is the sole responsibility of the user to classify the area of installation and make sure that absolutely no potentially explosive atmosphere can be present at any time!



#### CAUTION

- When this unit is included as a component part of a system, the resulting system design must be reviewed by qualified personnel who are familiar with the construction and operation of all individual components in the system and the potential hazards involved. Failure to observe this precaution could result in bodily injury!



#### CAUTION

- This unit must be installed, serviced, and operated in strict compliance with all locally applicable safety regulations and the rules for the prevention of accidents!

**!** **CAUTION**

- The power supply unit provides SELV voltages in accordance with EN 60950. Make sure that any peripheral device connected to the weighing terminal containing its own power supply also uses SELV voltages!

**!** **CAUTION**

- This module and its associated equipment must be installed, adjusted and maintained by qualified personnel only!

**W A R N I N G**

For the storage of volatile data the terminal contains a lithium battery. Risk of explosion if battery is replaced improperly! Replace only with battery of the same type or with compatible type recommended by manufacturer. Disposal of used batteries only as indicated by manufacturer.

If the external power supply unit 'ITX000ET Externes Netzteil' (external power supply) is used, also the following instructions must be observed:

**W A R N I N G**

Before opening the housing pull the power plug or disconnect the unit from the mains supply.  
Risk of electrical shock!

**!** **CAUTION**

- Input voltage of the unit must comply with local mains supply!

**!** **CAUTION**

- If the line cord with connector is used as the means to separate the power supply from the mains, the wall outlet must be installed close to the unit and must be easily accessible! If a permanently connected mains cable is used, an easily accessible separator must be included in the supply circuit!

**!** **W A R N I N G**

- The device uses the short-circuit / overcurrent protection of the on-site mains supply.

Compliance with the following safety instruction is mandatory for UL approved units:

**!** **CAUTION**

- For power supply of the IT8000ET-DC use LPS and/or NEC class 2 power supply units only.

**Note:**

- Only permit qualified personnel to operate this instrument!  
Disconnect all power to this instrument before cleaning and servicing!
- All switch gear connected to the unit and/or installed close to it, such as relays and contactors, must be fitted with appropriate components (RC-modules, diodes) to suppress interference.
- In order to avoid static discharge, all metallic parts of a system must be thoroughly grounded.  
Movable parts, such as portable scales on plastic wheels, must be grounded with earth clamps or earth leads of appropriate diameter.
- Keep this manual for future reference!

## 1.3 Précautions d'emploi (ETL)



### A V E R T I S S E M E N T

Retirez la fiche de réseau avant d'ouvrir l'appareil ou coupez le courant du terminal – Danger de mort !



### A V E R T I S S E M E N T

Attention en actionnant les touches de commande des dispositifs de transport, trappe etc.  
Avant d'actionner ces touches vérifiez que personne ne se trouve dans le périmètre d'action du mouvement.



### A V E R T I S S E M E N T

L'IT8000ET ne pourra pas être utilisé dans un environnement comportant un danger d'explosion. La classification correspondante est en tout cas l'obligation de l'utilisateur (division en catégories : zones, groupes d'explosion, catégories de température etc.). Adressez-vous à ce sujet aux autorités d'inspection locales et aux organismes de contrôle des normes de sécurité.



### A V E R T I S S E M E N T

La structure du système doit être contrôlée par des experts qualifiés qui connaissent la construction et la fonction de tous les éléments connectés, si l'appareil fait partie d'un système global !



### A V E R T I S S E M E N T

Pour l'installation, les travaux de maintenance et pendant l'utilisation, tenez compte des directives du VDE (association des électriciens allemands) et des consignes locales de sécurité et de prévention des accidents !



### A V E R T I S S E M E N T

Le bloc d'alimentation fournit du côté sortie des tensions SELV (très basse tension de sécurité). En cas de raccordement de composants externes (interfaces sérielles, sorties parallèles), assurez-vous qu'il n'y a que des tensions SELV.



### ATTENTION

• La tension du réseau local doit correspondre à la tension d'entrée de l'appareil !



### ATTENTION

• Cet appareil et ses périphériques ne doivent être installés, ajustés et entretenus que par un personnel qualifié.



### ATTENTION

• La prise doit se trouver à proximité immédiate de l'appareil et son accès doit être facile, si l'on relie le terminal de pesage par un câble de réseau avec une fiche. Prévoir un dispositif de séparation facilement accessible au circuit d'alimentation, si la connexion est fixe.



### ATTENTION

• L'appareil utilise la protection contre les courts-circuits / dispositif de protection contre les surintensités des bâtiments installés sur site.

## 1.4 Declaration Of Conformity (US)

SysTec Systemtechnik und Industrieautomation GmbH  
Ludwig-Erhard-Str. 6  
D-50129 Bergheim-Glessen



The non-automatic weighing instrument, type	IT8000ET-AC IT8000ET-DC
Manufacturer	SysTec GmbH
No. of NTEP type-approval certificate	NTEP CC No. 08-006 III / III L



3162737

Conforms to UL STD 60950-1

Certified to CAN/CSA STD C22.2 No. 60950-1

Conforms to the requirements of the following standards and specifications:

NIST Handbook 44, 2007 Edition, NCWM Publication 14, 2007 Edition

FCC 47 CFR Ch. 1 Part 15 2007-09-20

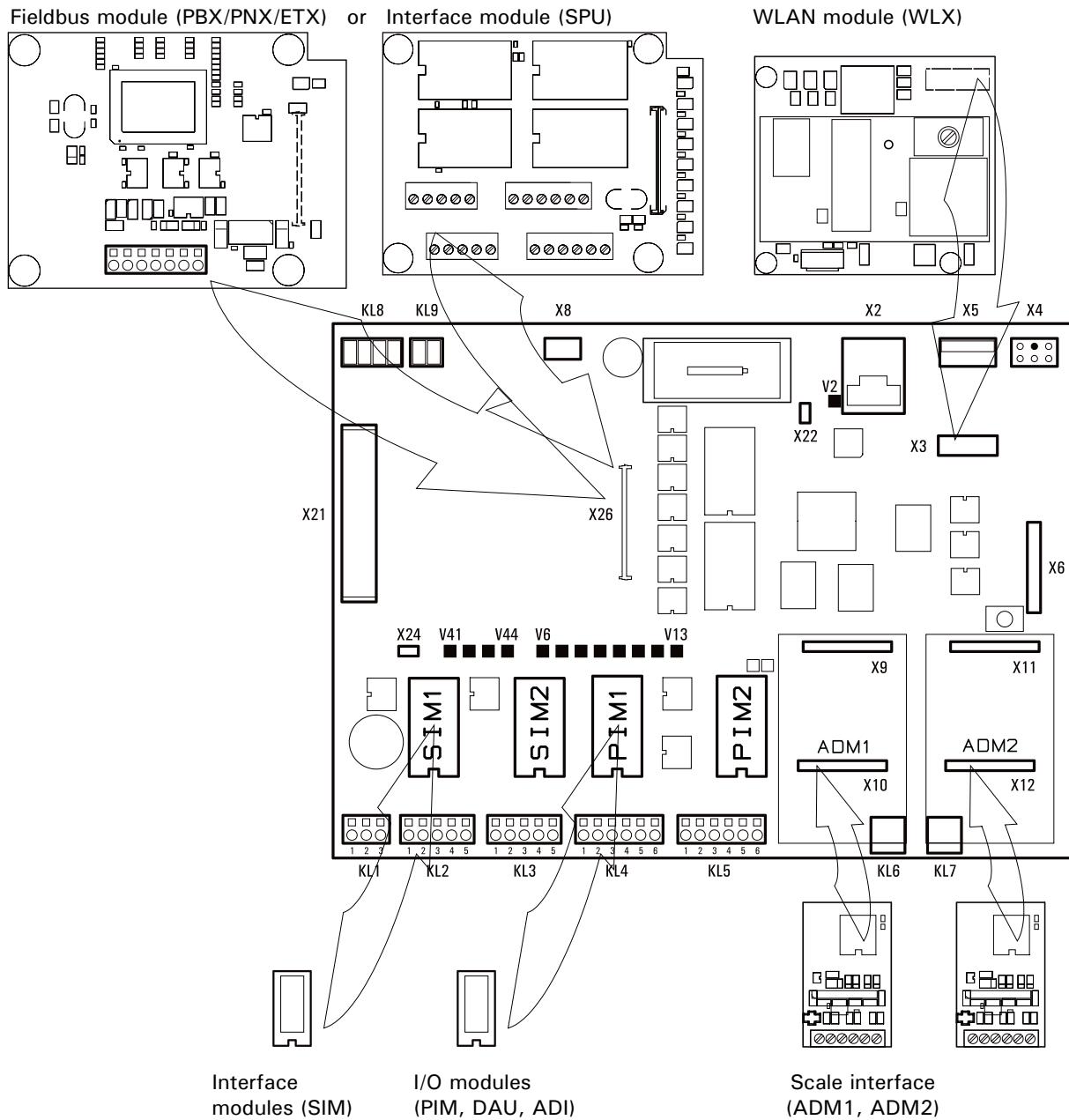
Section 15.107 (a), limits same as IEC/CISPR 22:1997 (EN 55022:1998) Class B

Section 15.109 (a) Class B, and/or

Section 15.109 (g), i.e. IEC/CISPR 22:1997 (EN 55022:1998) Class B

## 2 System Description

This weighing terminal features a modular design with plug-on modules.



For more detailed information on the individual plug-on modules, the TFT display and the power supply refer to chapter 'Installation'.

LEDs on mainboard

LED	Function	
V44	3V3	3.3 V CPU logic
V42	5V	5 V peripherals
V41	12V	12 V peripherals
<b>Ethernet interface:</b>		
V2	LAN	Traffic / connected
<b>ADM scale modules:</b>		
V43	ANA:5V	5 V for ADM

PIM logic side active:		
V10	INO	PIM1 input #1
V11	IN1	PIM1 input #2
V6	OUT0	PIM1 output #1
V7	OUT1	PIM1 output #2
V12	IN2	PIM2 input #1
V13	IN3	PIM2 input #2
V8	OUT2	PIM2 output #1
V9	OUT3	PIM2 output #2

### 3 Installation

#### 3.1 Safety Advice



##### W A R N I N G

Before opening the housing disconnect all power to the instrument. Only connect / disconnect any cables when unit is completely deenergized. Failure to observe this precaution could result in bodily injury!

##### Notes:

- Transport and storage of electronic components such as boards, EPROMs, etc. must only be made in suitable anti-static ESD bags or cases.
- Shielding measures for the connection of cables must absolutely be adhered to. Insufficient shielding may cause interference and could result in malfunction of the instrument.

Compliance with the following safety instructions is mandatory for UL approved units:



##### CAUTION

- For power supply of the IT8000ET-DC use LPS and/or NEC class 2 power supply units only.



##### CAUTION

- Use UL-approved cables only for connections to the weighing terminal.

- Only suitable cables may be connected to the 24 V power supply unit, complying with the specification below:
  - $U_N > 30 \text{ V}$ ;
  - suitable for the environmental conditions prevailing at site of installation (indoor / outdoor / temperature / humidity);
  - UL approval (e.g. category AVLV2, QPTZ or DUZX);
  - gauge  $26 < \text{AWG} < 16$ ;
  - diameter of cable  $4 \text{ mm} < d < 8 \text{ mm}$ .

#### 3.2 Setup Of The Instrument

Ambient temperature for operating the unit may range from  $-10 \text{ }^{\circ}\text{C}$  to  $+40 \text{ }^{\circ}\text{C}$ , at a maximum of 95 % relative humidity, without condensation. Exposure to direct sunshine should be avoided.

For wall-mount applications the terminal can be fixed at the wall first, the connection cables can be fitted later with the lid of the housing removed.

### 3.2.1 Securing Unit For Wall-Mount Installation

**Compliance with the following safety instructions is mandatory for UL approved units:**

In order to comply with UL guidelines, the components must only be secured with the fixing materials described below. The positions of the fixing holes for the device are shown in the section 'Dimensions'.

**Fixing to metal:**

Type	Screw type <sup>1)</sup>
A	M6 x 12
	Note <sup>1)</sup> represents min. length

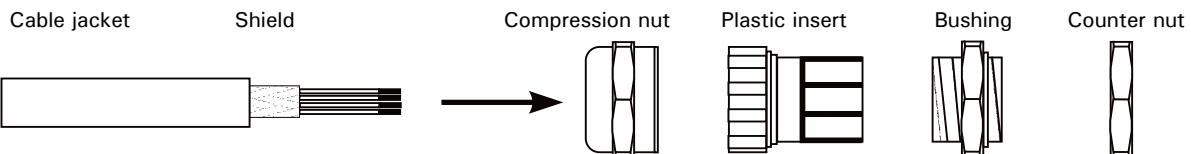
**Fixing to reinforced concrete:**

Type	Screw type <sup>1)</sup>	Plug type (Nylon)
A	6 x 40 mm	8 mm, e.g. Fischer S8, type No.: 50108
	Note <sup>1)</sup> represents min. length	

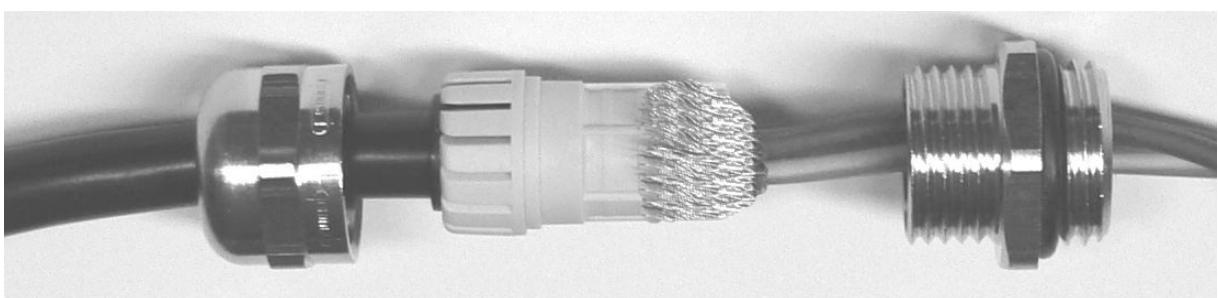
Ensure that the wall or ceiling can hold four times the total weight of the device.

## 3.3 Connection Of Cables

All cables are led into the housing through cable glands.



1. Slide compression nut over cable jacket;
2. Slide plastic insert (retainer) over cable jacket until inner end is aligned with cut end of jacket;
3. Unravel shield, bend over retainer and push into retaining comb to ensure good conductive contact with housing. Cut wires of shield to length of comb, avoid protruding wires that would endanger tightness of cable gland;



4. Insert retainer with cable into bushing;
5. Screw compression nut onto bushing and use wrench to tighten securely.



### WARNING

Cut cable ends as short as possible and make sure that they cannot touch any parts conducting mains voltage (mains cable, power supply unit)!

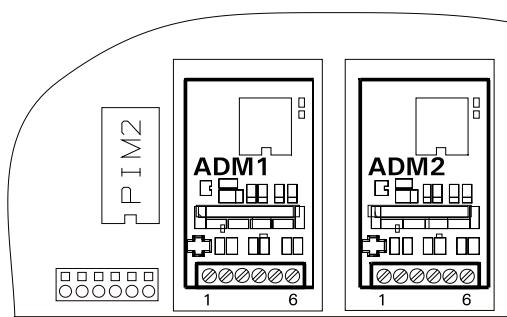
Use wire end ferrules with plastic collar on stranded cables and avoid protruding wires!

## 3.4 Connection Overview

### 3.4.1 ADM

6-wire	
1	+ Excitation
2	- Excitation
3	+ Sense
4	- Sense
5	+ Signal
6	- Signal

4-wire	
1 / 3	+ Excitation
2 / 4	- Excitation
5	+ Signal
6	- Signal

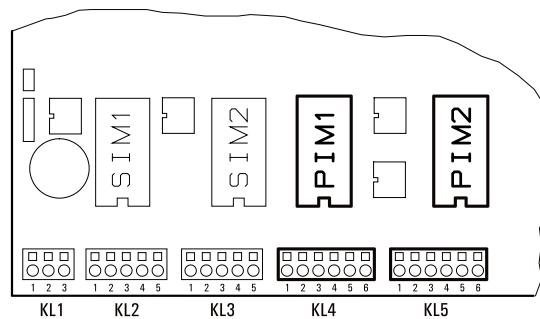


### 3.4.2 CPU

KL2 Serial interface 1 (COM1) KL3 Serial interface 2 (COM2)			
Terminal#	RS232	20 mA	RS485 4-wire
1	TxD	TX <sub>IN</sub>	Tx A (Tx+)
2	RTS	TX <sub>OUT</sub>	Tx B (Tx-)
3	RxD	RX <sub>IN</sub>	Rx A (Rx+)
4	CTS	RX <sub>OUT</sub>	Rx B (Rx-)
5	Gnd	—	—



KL4 / 5: digital inputs and outputs 0–3			
KL4	KL5		
1		0V	
2		+ 12V	for external switches only!
3		INO	
4		IN1	
5		IN2	
6		IN3	
	1	IN-	for IN0–IN3
	2	OUT0	
	3	OUT1	
	4	OUT2	
	5	OUT3	
	6	OUT+	for OUT0–OUT3



Terminal assignment of DAU15			
DAU15 in socket:		PIM1	PIM2
I +	+ Current output 0/4–20 mA	KL4.3	KL4.5
I -	- Current output 0/4–20 mA	KL4.4	KL4.6
U +	+ Voltage output 0/2–10 V	KL5.2	KL5.4
U -	- Voltage output 0/2–10 V	KL5.3	KL5.5

Terminal assignment of ADI			
ADI in socket:		PIM1	PIM2
I +	+ Current input 0/4–20 mA	KL5.2	KL5.4
I -	- Current input 0/4–20 mA	KL5.3	KL5.5
U +	+ Voltage input 0/2–10 V	KL4.3	KL4.5
U -	- Voltage input 0/2–10 V	KL4.4	KL4.6

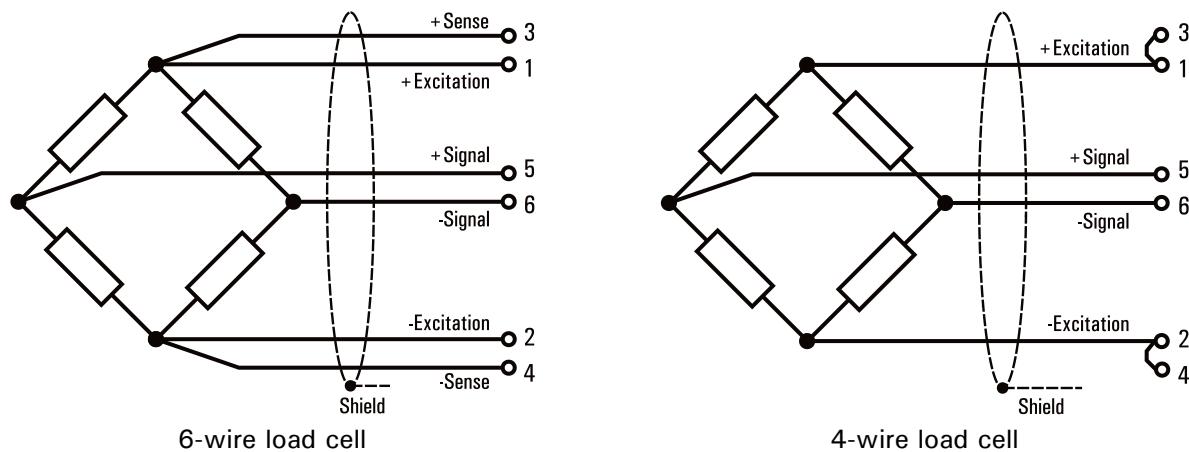
## 3.5 Connection Of Scales

### 3.5.1 Connection Of Analog Scale To ADM

The ADM module provides connection for weighing platforms and load cells as specified below. One or two scale interface modules can be installed.

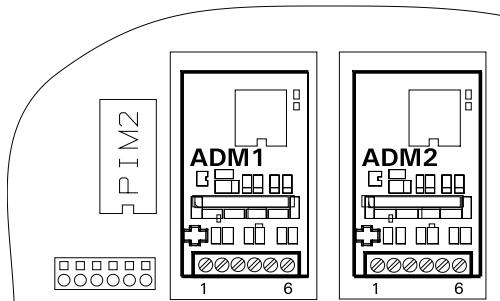
- Max. 8 strain gauge load cells  $350 \Omega$  each
- Overall impedance  $43 \Omega \dots 4500 \Omega$
- W&M approved resolution of 6,000 e at a max. preload of 80 %, internal resolution 524,000 d
- Smallest permissible input signal for approved applications:  $0.33 \mu\text{V} / \text{e}$
- Update rate 50–400 updates / second (selectable in Service Mode)
- Load cell excitation:  $5 \text{ V} \pm 5 \%$  (gated power supply).

**Principal schematics of 6-wire and 4-wire strain gauge load cell:**



**Connection of 6-wire analog load cell(s) to ADM:**

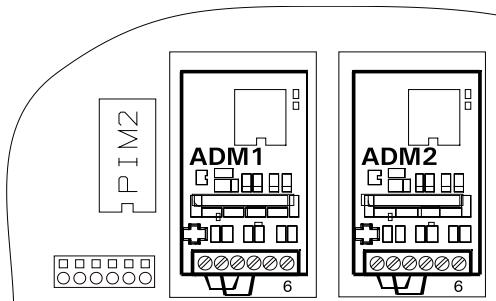
Terminal Assignment	
1	+ Excitation
2	- Excitation
3	+ Sense
4	- Sense
5	+ Signal
6	- Signal



### Connection of 4-wire analog load cell(s) to ADM:

To connect load cells without sense lines (4-wire connection), two jump leads must be connected between terminal 1 and 3, and between terminal 2 and 4.

Terminal Assignment	
1 / 3	+ Excitation
2 / 4	- Excitation
5	+ Signal
6	- Signal

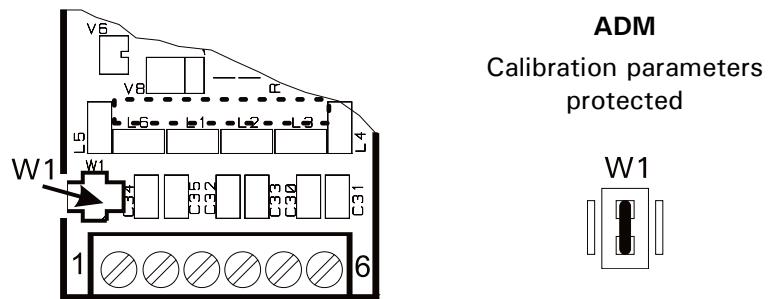


For the installation of connection cables for analog weighing platforms please follow the recommendations listed below:

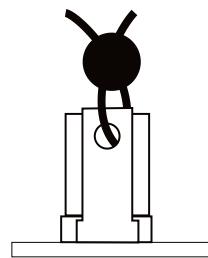
- Only use suitable load cell cable:  
(e.g. SysTec order No. 10KAB214,  $3 \times 2 \times 0.75 \text{ mm}^2$ , shielded, max. 200 m)
  - Nominal voltage of cable  $\geq 250 \text{ V}$
  - Shielded cable (shielding braid)
  - Length and cross section of the individual wires must comply with the following condition:  
 $\text{Cable length (m)} / \text{Cross section (mm}^2\text{)} \leq 270 \text{ (m/mm}^2\text{)}$
  - Maximum length of connection cable between weighing platform and weighing terminal: 200 m
- Unsuitable load cell cables may affect accuracy.
- The shield of the load cell cable must be connected all around the cable in the cable gland of the weighing terminal (see also chapter 'Installation' / 'Connection Of Cables'). If an extension of the load cell cable is required use only metal junction boxes and cable glands. The shield on both sides must be connected in the same way as at the terminal. Load cells and/or weighing platforms, junction boxes and the terminal must be included in the potential equalization of the components of a weighing system. Depending on the situation on site this may require the installation of a separate earth lead of appropriate diameter (e.g. 16 mm $^2$ ) in parallel to the load cell cable.
- Distance between load cell cables and power lines:  $\geq 0.5 \text{ m}$ . Install load cell cables in grounded metal conduits, metal hoses or metal cable trays.
- If tension load is applied to load cells instead of compression load, connection for + Signal and - Signal must be transposed.

### 3.5.2 Sealing Of Calibration Parameters

By means of the jumper W1 the calibration parameters stored in ADM can be protected against unauthorized modifications:



If required for W&M approved and stamped systems, the position of the jumper W1 can be sealed with thread and lead seal or via paper seal:



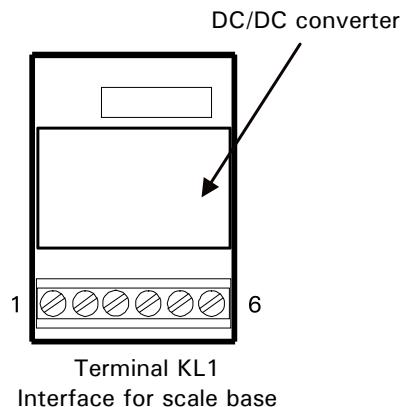
### 3.5.3 Connection Of Digital Mettler-Toledo Scale Bases With IDNet Interface

The **IDN** module (**IDNet** interface module) permits the connection of Mettler-Toledo scale bases with **IDNet** interface.

One or two **IDN** modules may be installed. If only one **IDN** is used, the remaining socket **ADM2** can then be used for an additional **ADM** board to connect a scale base with up to 8 analog load cells (350  $\Omega$  each). If an **IDN** module is installed in socket **ADM2**, the serial interface **SIM2** must not be used!

The **IDN** module supplies a current of 150 mA max. at 12 VDC for the supply of the **IDNet** scale base.

**IDN interface module**



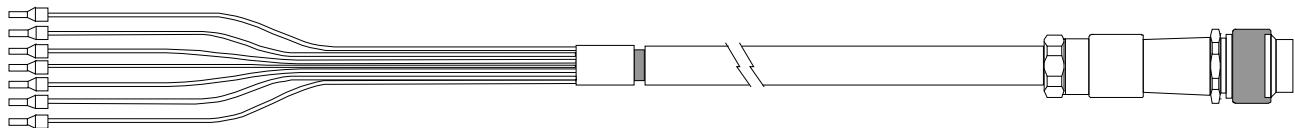
Terminal KL1	Signal	Function
1	TxD—	— transmit line 20 mA CL
2	TxD+	+ transmit line 20 mA CL
3	RxD—	— receive line 20 mA CL
4	RxD+	+ receive line 20 mA CL
5	0 V	0 V supply voltage
6	+ 12 V (150 mA)	+ 12 V supply voltage

**IDNet** understructures which operate on 12 VDC power supply (e.g. **TBrick**) are connected with the **IDNet** scale cable 16KAB002.

For **IDNet** scale bases with 12 V and 32 V power supply (e.g. **K-Cell**) the external power supply unit **IDNet-PSBox** (10OPT124) is required. The connection is made with the **IDNet** scale cable 16KAB004.

**Standard cable for the connection of digital weighing platforms (approx. 0.3 m):**

IDNet connecting cable for Mettler-Toledo scale bases  
Art. No. 16KAB002 / 16KAB004 (ST.2300.0064)



Terminal Strip KL1	Color	Signal	Pin Assignment (12-pin Binder Connector)
1	yellow	TxD-	J
2	green	TxD +	A
3	white	RxD-	F
4	brown	RxD +	D
5	pink	0 V	H
6	gray	+ 12 V	C
	blue	+ 32 V	B

**Note:**

The blue wire of cable 16KAB002 (for IDNet scale bases with 12 V supply) is not used and must be cut directly at the cable gland.

The pink and blue wires of cable 16KAB004 (for IDNet scale bases with 12 V and 32 V supply) are fitted with crimp contacts for connection to the IDNet-PSBox.

### 3.5.4 Interface For Digital Force Transducers with RS485 Interface (DWB)

The **DWB module** (Digital Weighing Board) permits the connection of one digital force transducer operating on 12 VDC power supply and communicating with the weighing terminal via RS485 2-wire or 4-wire network.

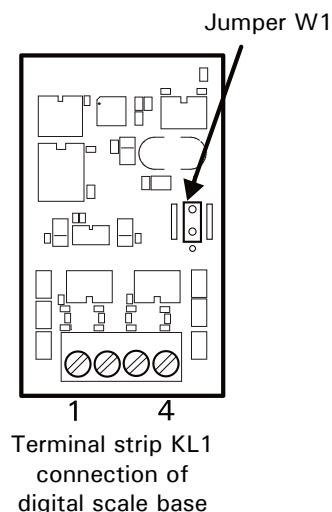
At present, scale bases and load cells are supported as follows:

- Sartorius series IS weighing platforms
- HBM series C16i load cells
- Flintec series RC3D load cells

Calibration data are stored power-fail-safe in a serial EEPROM on the DWB module. By means of the jumper W1 these data can be protected against unauthorized access.

One or two DWB modules may be installed. If only one DWB is used, the remaining socket ADM2 can then be used for an additional ADM board to connect a scale base with up to 8 analog load cells (350 Ω each).

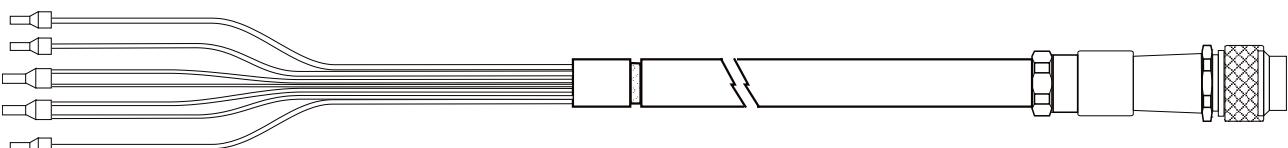
### DWB interface module



Terminal KL1	Signal RS485 4-wire	Signal RS485 2-wire	Assignment
1	Tx A (Tx +)	A (Tx + / Rx +)	+ transmit line RS485
2	Tx B (Tx -)	B (Tx - / Rx -)	- transmit line RS485
3	Rx A (Rx +)	-	+ receive line RS485
4	Rx B (Rx -)	-	- receive line RS485

Standard cable for the connection of digital Sartorius weighing platforms series IS (approx. 0.3 m):

RS485 2-wire connecting cable for Sartorius weighing platforms  
Art. No. 16KAB001 / ST.2300.0098



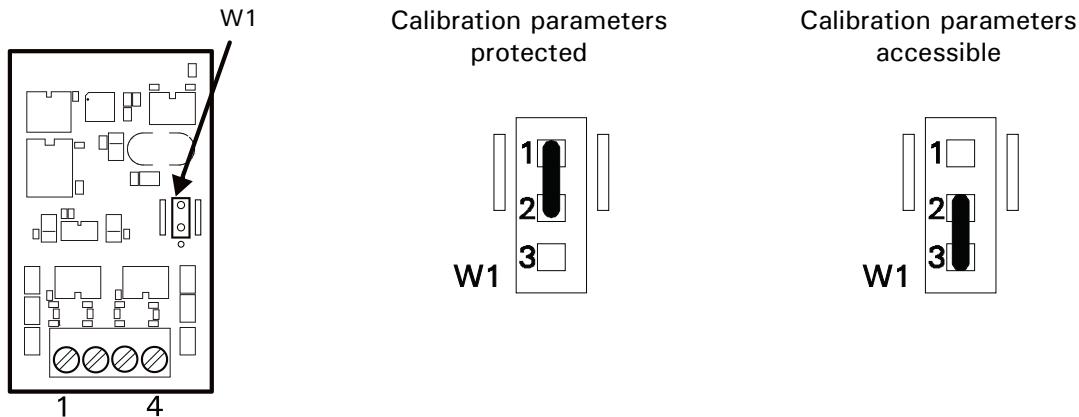
Terminal KL1 (DWB)	Color	Signal	Pin assignment (12-pin Amphenol connector)
1	green	Tx + / Rx +	L
2	yellow	Tx - / Rx -	A
-	blue *	PROG	F

Terminal KL6 (CPU)	Color	Signal	Pin assignment (12-pin Amphenol connector)
OV	brown / white	Gnd	K + J + E
12V	gray / pink	+ 12 V	G + M

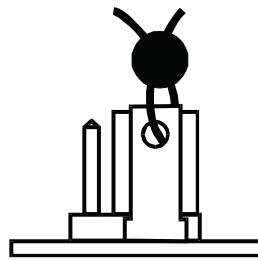
\*) Note: The blue wire (PROG) is not used and should be cut directly at the cable gland.

### 3.5.5 Sealing Of Calibration Parameters

By means of the jumper W1 the calibration parameters stored in DWB can be protected against unauthorized modifications:



If required for W&M approved and stamped systems, the position of the jumper W1 can be sealed with thread and lead seal or via paper seal:



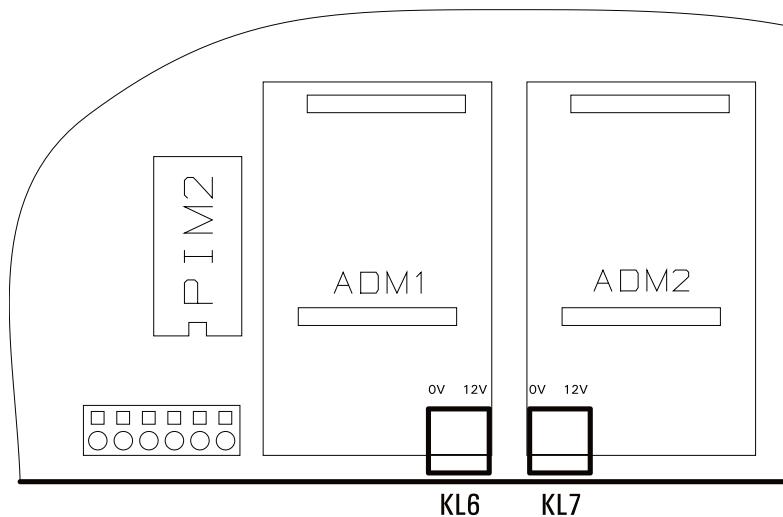
### 3.5.6 Connection Cables For Digital Force Transducers

Unsuitable cable may cause loss of data. For the installation of connection cables for **digital** weighing platforms please follow the recommendations listed below:

- Only use suitable connecting cable (data cable), e.g. 6 x 0.25 mm<sup>2</sup> shielded, SysTec order No. 10KAB216, or data cable supplied by the manufacturers of scale base.
- Nominal Voltage of cable  $\geq 250$  V.
- Connect shield of cable at **both sides**, at cable gland of terminal and at scale base and/or extension cable. Install appropriate equipotential bonding if difference of potential is experienced.
- Distance between data cables and power lines:  $\geq 0.5$  m. Install data cables in grounded metal conduits, metal hoses or metal cable trays.
- Maximum length of connection cable between weighing platform and terminal: 15 m.

### 3.5.7 Auxiliary Power Supply For Digital Force Transducers

An auxiliary power supply of 12 VDC for digital force transducers is available at terminals KL6 and KL7.



Assignment terminal strips KL6 and KL7

12V	12 VDC (500 mA in total) incl. current drawn at KL1
0V	0 V (12)

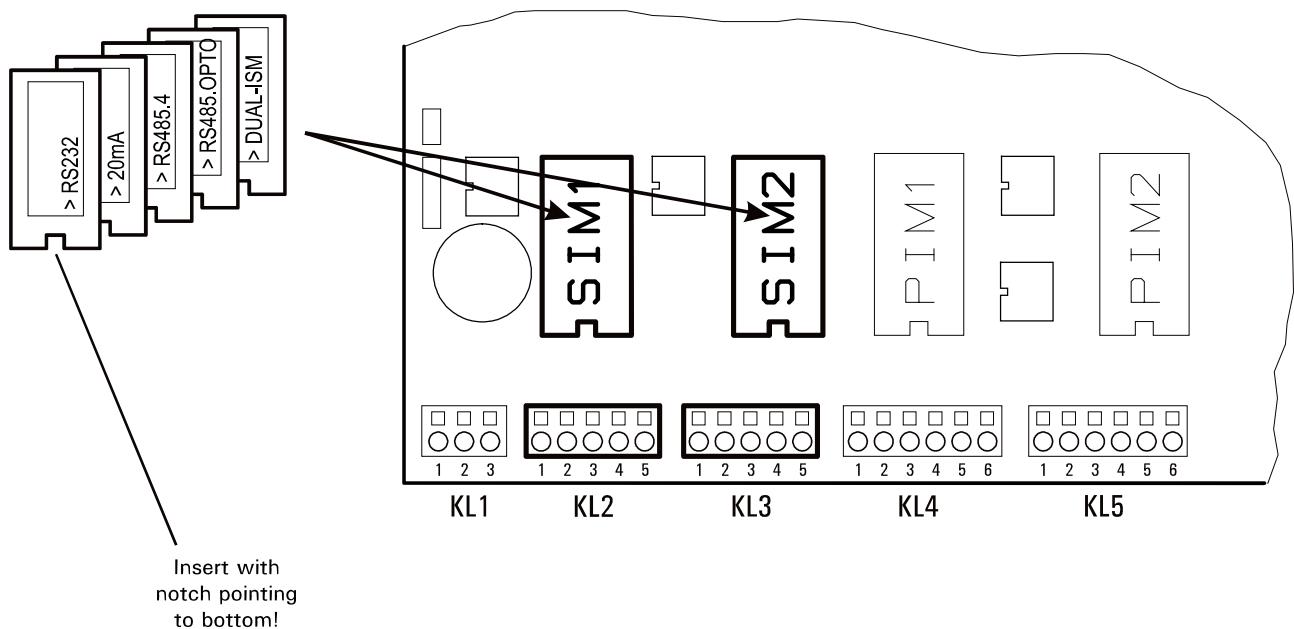
### 3.6 Connection Of Serial Interfaces (SIM And DUAL-ISM)

The following plug-on modules for serial interfaces and an incremental sensor can be installed in the SIM sockets:

- 'SIM RS232' RS232 interface
- 'SIM 20mA' 20 mA current loop interface
- 'SIM RS485.4' RS485/422 4-wire interface
- 'SIM RS485.OPTO' RS485 4-wire optoisolated interface
- 'DUAL-ISM' to connect dual-channel pulse wheel
- SPU only: 'SIM RS485.2' RS485 2-wire interface

Please note: When a 20 mA interface is used, receiver and transmitter of the weighing terminal are always passive, i.e. supply voltage for the current loops must be provided by the connected peripheral device.

**Connection of serial interface on the mainboard:**

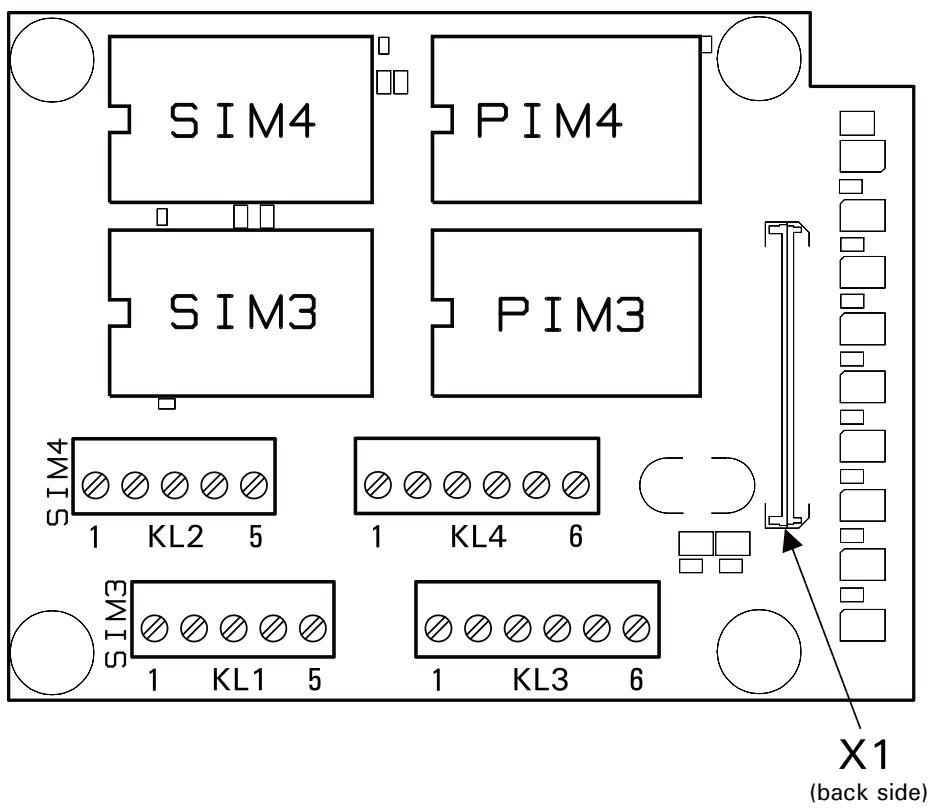


**Terminal assignment:**

Serial interface 1 (COM1): KL2 Serial interface 2 (COM2): KL3			
Terminal#	RS232	20 mA	RS485 4-wire
1	TxD	TX <sub>IN</sub>	Tx A (Tx +)
2	RTS (COM1 only)	TX <sub>OUT</sub>	Tx B (Tx -)
3	RxD	RX <sub>IN</sub>	Rx A (Rx +)
4	CTS (COM1 only)	RX <sub>OUT</sub>	Rx B (Rx -)
5	Gnd	—	—

With SPU interface expansion module additional serial interfaces can be connected. The sockets SIM3–SIM4 provide connection for up to 2 SIM modules.

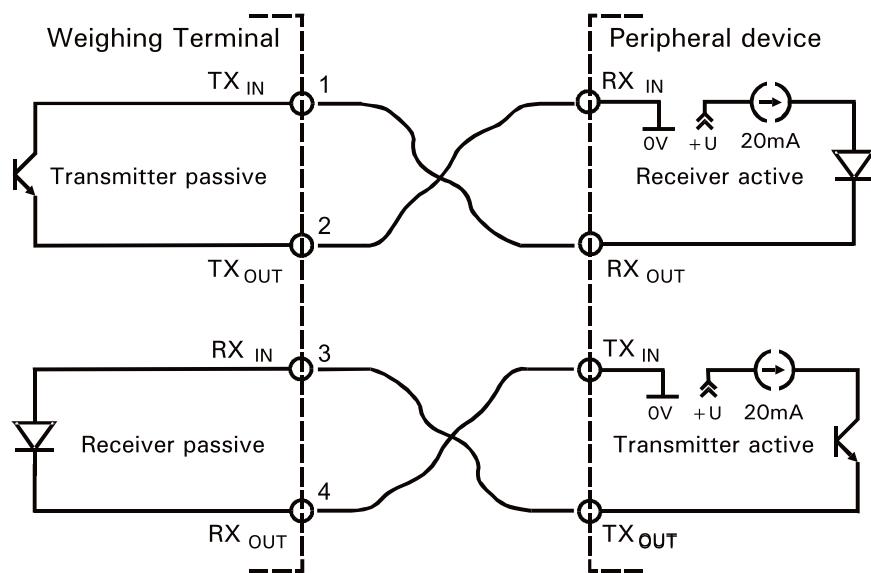
**Connections on SBU board**



Connector SPU	Socket mainboard
X1	X26

Serial interfaces					
SIM3 (COM3)	SIM4 (COM4)	RS232	20 mA	RS485 4-wire	RS485 2-wire
KL1.1	KL2.1	TxD	TX <sub>IN</sub>	Tx A (Tx +)	A (Tx + / Rx +)
KL1.2	KL2.2	RTS	TX <sub>OUT</sub>	Tx B (Tx -)	B (Tx - / Rx -)
KL1.3	KL2.3	RxD	RX <sub>IN</sub>	Rx A (Rx +)	—
KL1.4	KL2.4	CTS	RX <sub>OUT</sub>	Rx B (Rx -)	—
KL1.5	KL2.5	Gnd	—	—	—

**Principal circuit diagram of the 20 mA current loop interface:**



**For the installation of connection cables for serial interfaces please follow the recommendations listed below:**

- Install data cables to prevent capacitive or inductive interference from other cables, machines and/or electrical devices that could interrupt data transmission and lead to loss of data.
- For maximum suppression of interference, shield should be grounded on both sides.
- If fluctuation of the earth potential is experienced, this can cause an equalization current flowing over the shield. In this case a separate earth lead of appropriate diameter for potential equalization is required.
- Non-factory made cables must comply with the following specification:

Triple twisted pair plus shield, e.g. LIYCY 3 x 2 x 0.14 mm<sup>2</sup> or LIYCY 3 x 2 x 0.25 mm<sup>2</sup>, shield grounded on both sides.

Resistance	$\leq 125 \Omega/\text{km}$
Gauge	$\geq 0.14 \text{ mm}^2$ up to 200 m, $\geq 0.25 \text{ mm}^2$ up to 1200 m
Capacitance	$\leq 130 \text{ nF/km}$
Length RS232	max. 15 m
Length RS485	max. 1200 m
Impedance RS485	approx. 150 $\Omega$
Nominal voltage	$\geq 250 \text{ V}$

**For RS485 connections please note:**

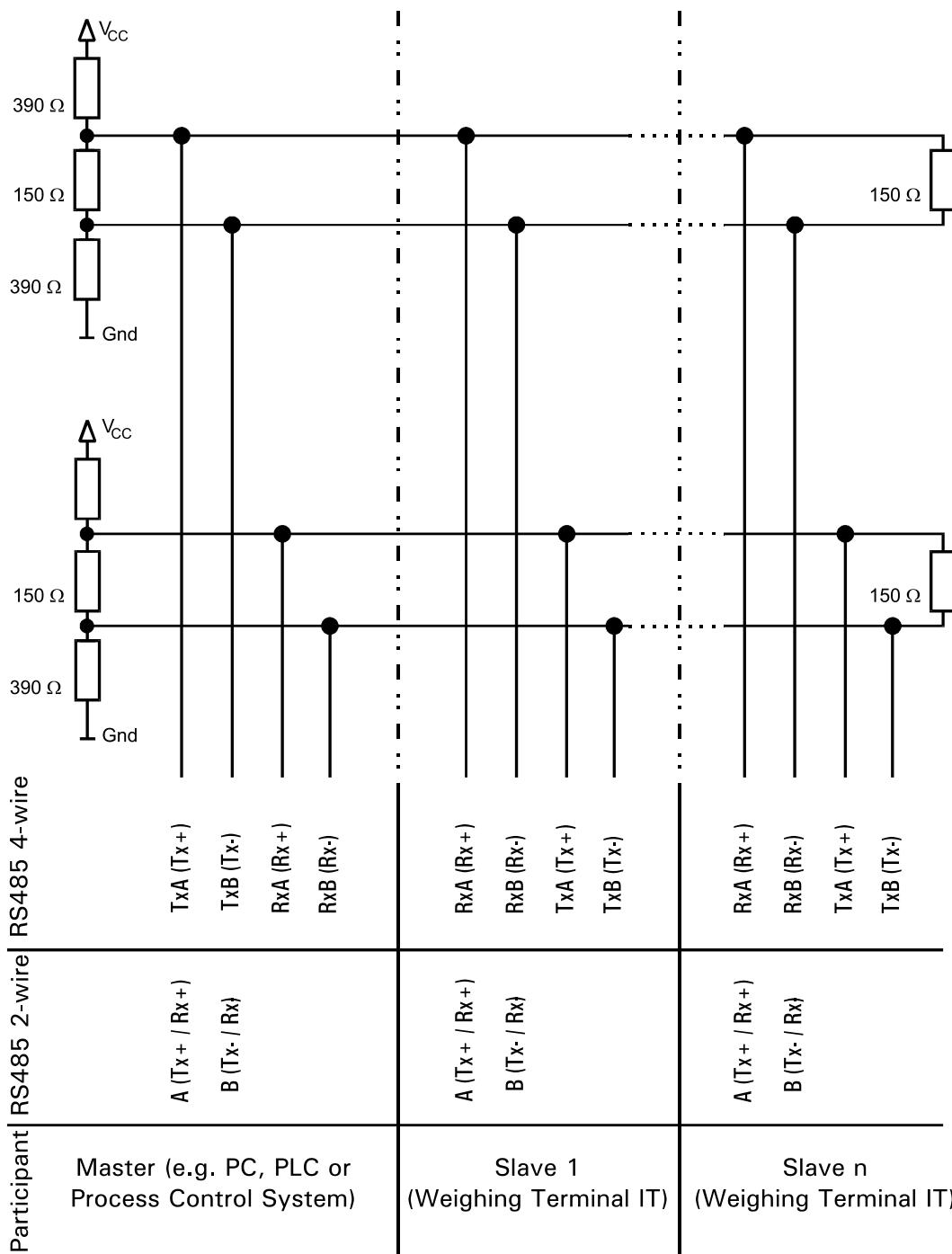
**Terminal assignment:** Some manufacturers of components with RS485 interface do not refer to the terminals TX+ and RX+ as 'A', but 'B' instead (correspondingly, the terminals TX- and RX- are not referred to as 'B', but 'A').

**Cables:** Use only twisted pair cables with a characteristic impedance of approx. 150 Ω.

**Termination resistors:** In order to prevent reflection (baud rate 19200 Baud or higher, and/or cable longer than 20 m) it is recommended to install termination resistors  $R_{Term} = 150 \Omega$  on both ends of the cable.

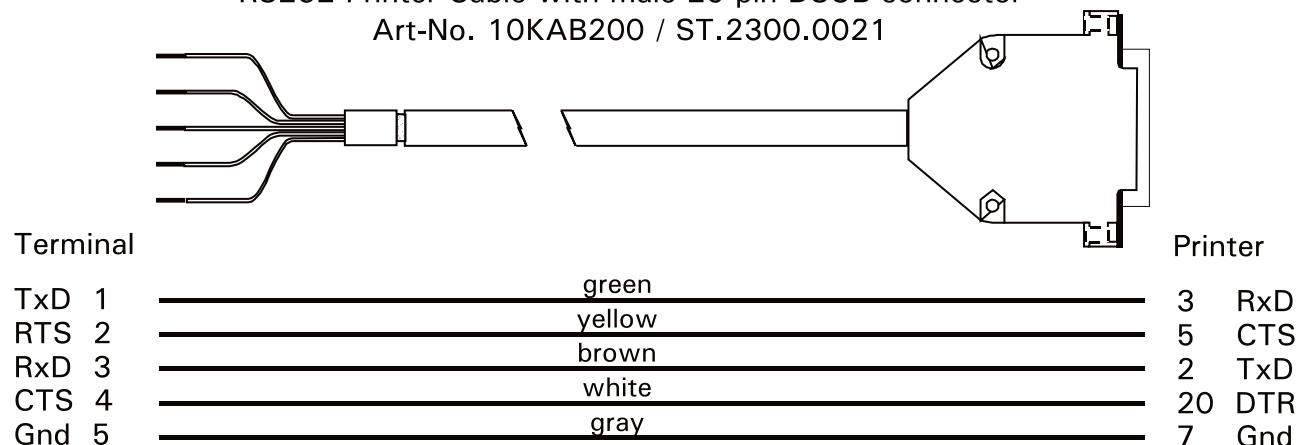
**Pull-up / pull-down resistors:** When termination resistors are used, also 390 Ω pull-up and pull-down resistors must be installed at the end of the cable (see schematic below). On the external I/O modules REL485 and TRIO485 all termination and pull-up/pull-down resistors are already part of the circuitry and can be activated/deactivated by means of jumpers.

**RS 485 network with termination, pull-up and pull-down resistors:**

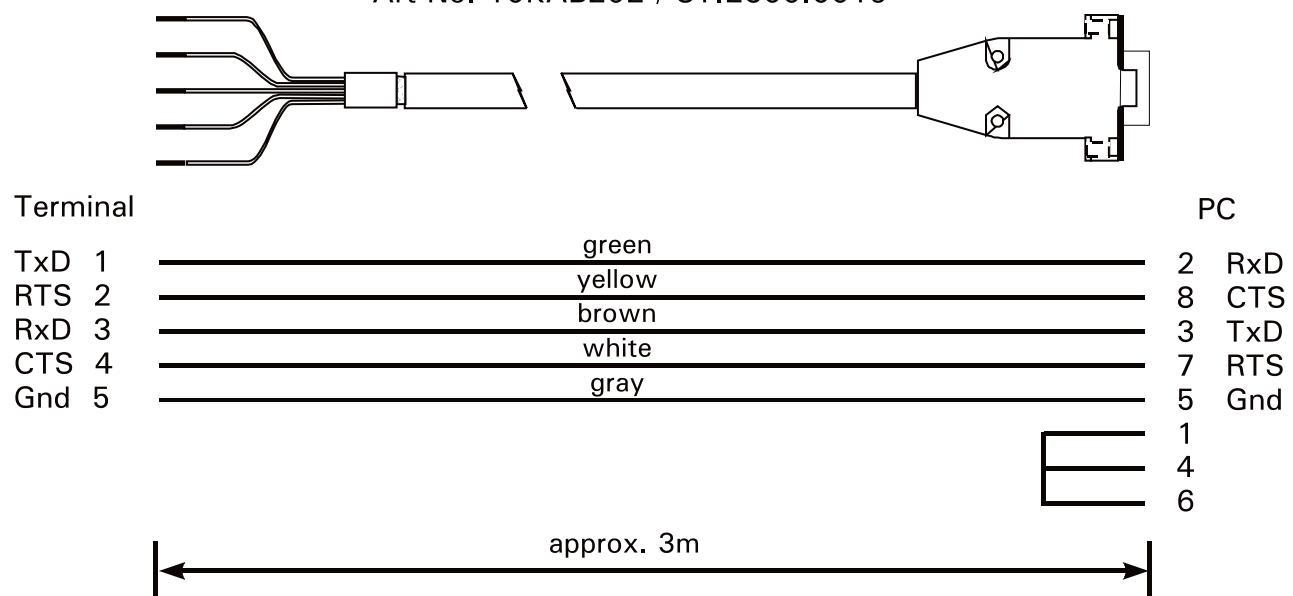


### 3.6.1 Standard Cables For Serial Interface

RS232 Printer Cable with male 25-pin DSUB-connector  
Art-No. 10KAB200 / ST.2300.0021



RS232 Data Cable with female 9-pin DSUB-connector  
Art-No. 10KAB202 / ST.2300.0019



### 3.7 Connection Of Single-/Dual-Channel Pulse Wheel (DUAL-ISM)

A pulse wheel (rotary pulse transmitter) can be connected to the indicator by means of a dual-channel (DUAL-ISM) interface (Impulse Sensor Module) plugged into one of the sockets SIM1 or SIM2 (SIM3/4 on SPU).

At the terminal strip KLx dual-channel incremental sensors (pulse wheels) can be connected that operate on 10 VDC and have PNP or push-pull outputs.

When a single-channel sensor is connected, terminal KLx.4 remains free.

**Terminal assignment of DUAL-ISM**

KLx	Assignment	Designation	Comment
1	10V	Supply for pulse wheel	100 mA max.
2	5V	-	
3	CHA	Pulse wheel channel A	Off = 0...3 V On = 7...10 V
4	CHB	Pulse wheel channel B	Off = 0...3 V On = 7...10 V
5	GND	GND supply for pulse wheel	

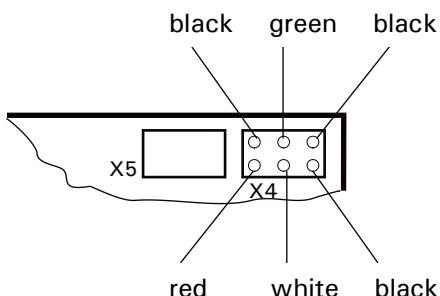
### 3.8 USB Connection

The SysTec 'USB memory stick, internal', No. 19OPT601 plugs directly into X5 on the mainboard. The USB connection can be led to the outside of the housing with one of the following options:

- 18OPT500, USB kit, USB socket protected to IP67, the counter nut must be firmly tightened;
- 10KAB431, patch cable 0.15 m with cable gland and USB socket type A;
- 10KAB433, patch cable 3 m with cable gland and USB socket type B.

**Note:**

- Internally the cable plugs into connector X4 on the mainboard. When inserting the connector, observe the color coding as shown below:



- When the external USB connection is used, the internal one (X5 on the mainboard) must not be used.

When a USB keyboard is used, the following assignment applies:

USB keyboard	Terminal
F1–F6	F1–F6
F8	
F9	
F10	
F11	
F12	
Shift + F12	Access Service Mode
Tab	

### 3.9 Ethernet Connection

Connection to a local 10/100 MBit Ethernet network is made via a connecting cable with RJ45 connector (internal connection at X2 on main board):

- 10KAB405, Ethernet cable 5 m with cable gland and RJ45 connector;
- 10KAB410, Ethernet cable 10 m with cable gland and RJ45 connector;
- 10KAB420 + 10KAB421, Ethernet cable with cable gland and RJ45 connector, customized cable length.

**Note:**

- When the external Ethernet connection is used, the WLAN module WLX cannot be connected at X3.
- Max. permissible cable length without repeater (hub/switch) is 80 m

When assembling your own cables, the shield of the cable must be connected inside the cable gland as shown below:

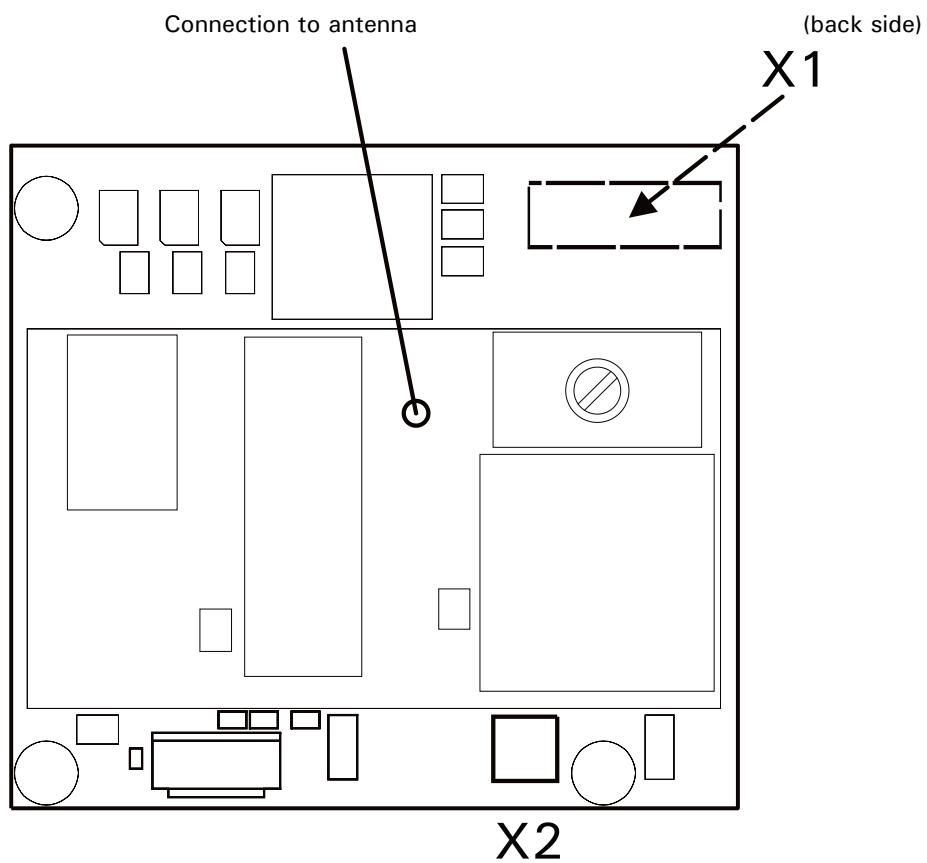


- Strip approx. 10 mm of cable jacket where cable gland is to be installed;
- Run cable through cable gland until shield of cable has reached the contact position;
- Tighten cable gland.

### 3.10 Connection Of WLAN Module WLX

For the WLAN connection (wireless network) the WLX module is plugged onto the main board and the antenna is connected.

**Connections on WLX module**



WLX	Socket mainboard
X1	X3
X2	Reset

**Note:** Use of WLX module (WLAN) and Ethernet connection (LAN) is NOT possible at the same time.

For a description of WLAN settings refer to:

- WLX Installation Instructions, order-No. ST.2309.1590

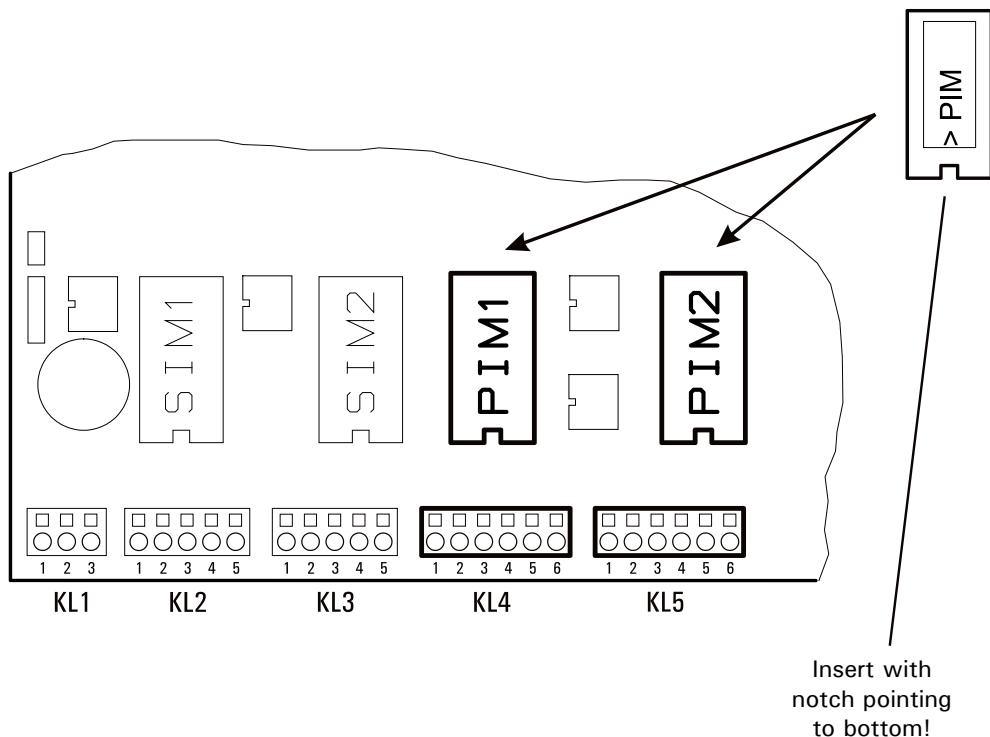
### 3.11 Connection Of Digital I/Os PIM

The digital input/outputs on the mainboard can be activated by inserting plug-on modules (PIM). Each module provides drivers for two optoisolated inputs and two optoisolated outputs.

Rating of outputs: 12–24 VDC at 100 mA max.

Current consumption of inputs: 7 mA max. at 12–24 VDC.

**Position and assignment of digital inputs/outputs on mainboard:**



#### Terminal assignment

KL4 / 5: digital inputs and outputs 0–3

KL4	KL5		
1		0V	
2		+12V	for external switches only!
3		IN0	
4		IN1	
5		IN2	
6		IN3	
	1	IN-	for IN0–IN3
	2	OUT0	
	3	OUT1	
	4	OUT2	
	5	OUT3	
	6	OUT+	for OUT0–OUT3

**Note:** The internal 12 VDC supply (terminal row KL4, terminal #2) may be used to connect switches (max. 100 mA) and push buttons to the digital inputs. External devices connected to the digital *outputs* must always be supplied from an external 24 VDC power supply.

With SPU interface expansion module additional digital interfaces can be connected. The sockets PIM3–PIM4 provide connection for up to 2 SIM modules.

<b>Digital I/Os on SPU:</b>			
PIM3 KL3	PIM4 KL4		
1		0V	
2		+ 12V	only for external switches! (See note below).
3		IN4	
4		IN5	
5		IN6	
6		IN7	
	1	IN–	for IN4–IN7
	2	OUT4	
	3	OUT5	
	4	OUT6	
	5	OUT7	
	6	OUT +	for OUT4–OUT7

#### For the installation of connection signal cables please note:

Install I/O cables to prevent capacitive or inductive interference from other cables, machines and/or electrical devices that could affect input/output signals and lead to malfunction and/or dangerous operational conditions.

Cables must comply with the following specification:

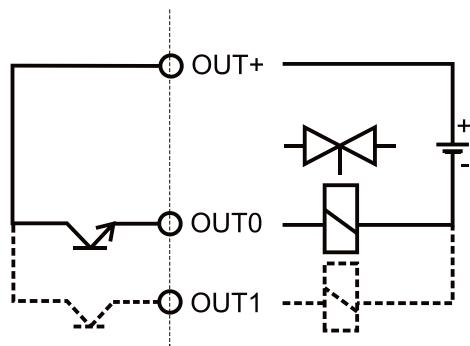
Shielded multicore cables, shield connected to ground on both sides. Flexible wires with wire end ferrules.	
Resistance	≤ 125 Ω/km
Gauge	0.2 mm <sup>2</sup> to 0.5 mm <sup>2</sup> max.
Capacitance	≤ 130 nF/km
Nominal voltage	≥ 250 V
Length	max. 15 m

#### Note:

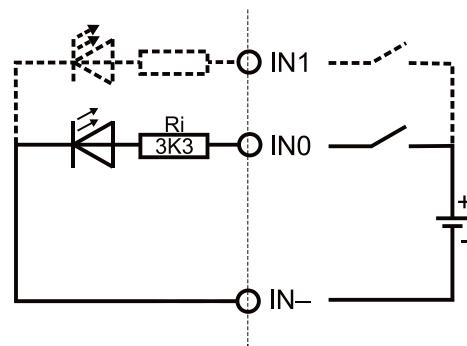
- For maximum suppression of interference, shield should be grounded on both sides.
- If fluctuation of the earth potential is experienced, this can cause an equalization current flowing over the shield. In this case a separate earth lead of appropriate diameter for potential equalization is required.
- The digital outputs on the mainboard and/or the SPU interface board use a common connection OUT +, the digital inputs a common connection IN–.

**Principal schematics PIM:**

Plus potential of the supply voltage for the two external outputs is connected to the common terminal OUT+. Minus potential of the supply voltage of the two digital inputs is connected to the common terminal IN-.



Digital output

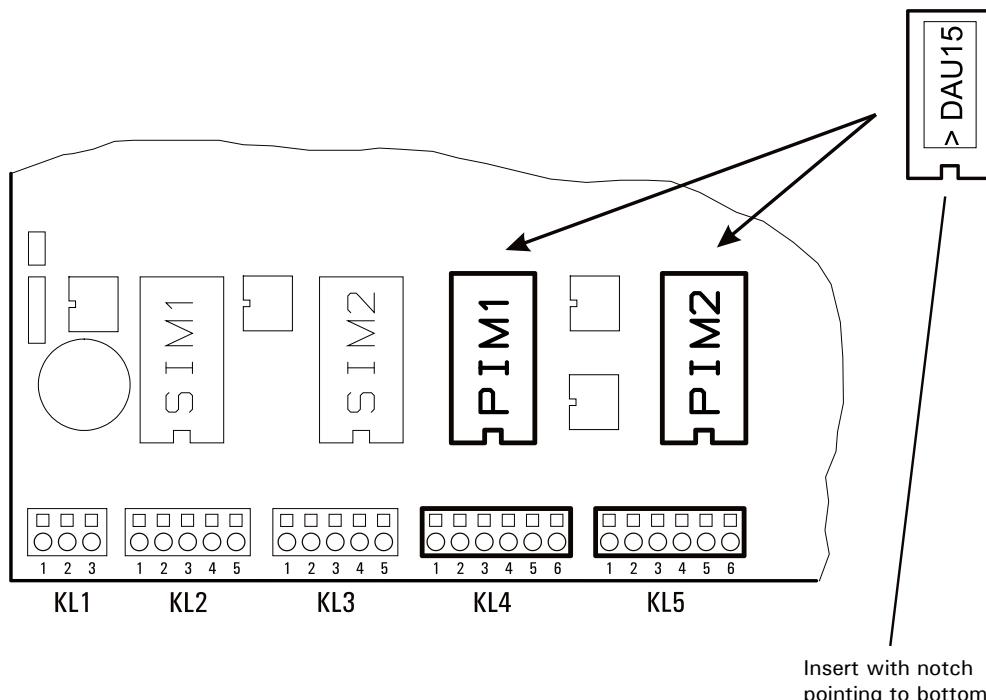


Digital input

### 3.12 Connection Of 15-Bit Analog Output (DAU15)

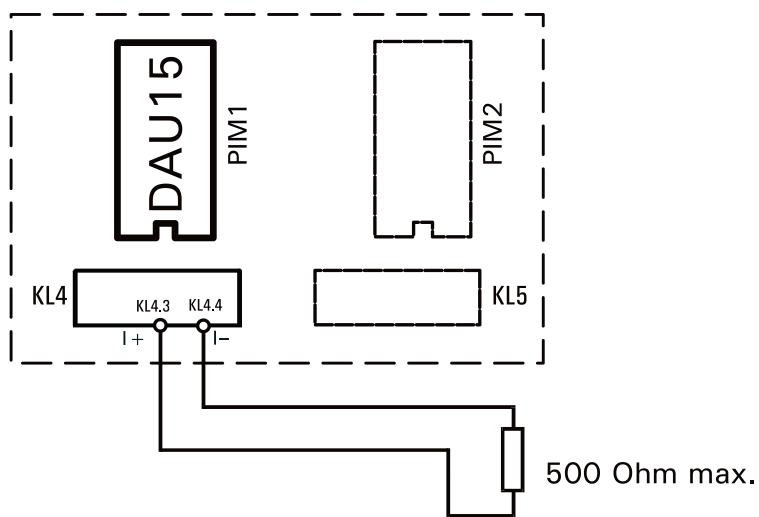
For the output of gross or net weight as analog 15-bit signal a plug-on module (DAU15) can be inserted in the socket PIM1 or PIM2 (PIM3/4 on SPU). The output signal has a resolution of 15 bit (32768 steps). The module can be configured in 'Config./Analog Out' of the Service Mode to 0/2–10 V or 0/4–20 mA. The output of the DAU15 module is active and potential free.

#### Installing the DAU15 in a PIM socket on the mainboard



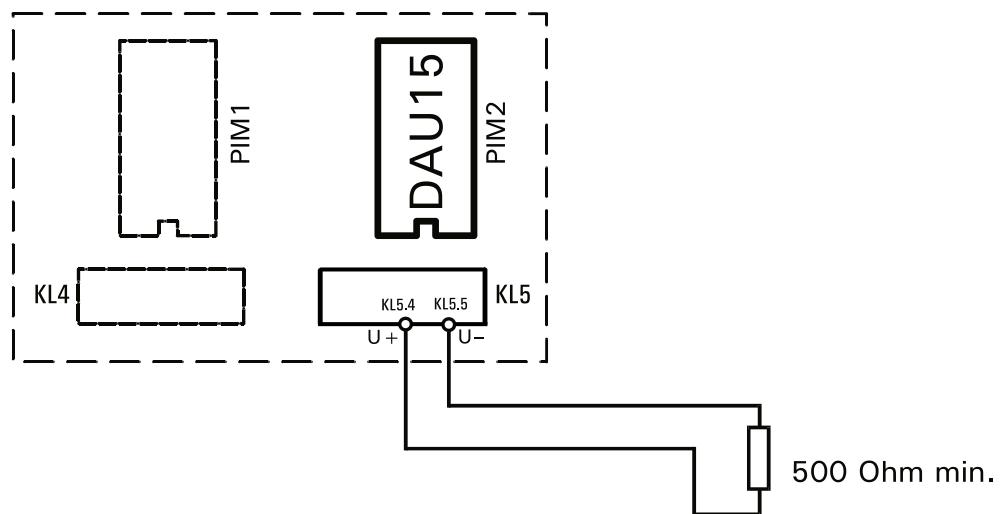
Terminal assignment of DAU15:						
DAU15 in socket:		Mainboard		SPU		
		PIM1	PIM2	PIM3	PIM4	
I+	+ Current output 0/4–20 mA	KL4.3	KL4.5	KL3.3	KL3.5	
I-	– Current output 0/4–20 mA	KL4.4	KL4.6	KL3.4	KL3.6	
U+	+ Voltage output 0/2–10 V	KL5.2	KL5.4	KL4.2	KL4.4	
U-	– Voltage output 0/2–10 V	KL5.3	KL5.5	KL4.3	KL4.5	

**Example for current output 0/4–20 mA (DAU15 in socket PIM1):**



The impedance of the connected load must not exceed 500 Ohm.

**Example for voltage output 0/2–10 V (DAU15 in socket PIM2):**

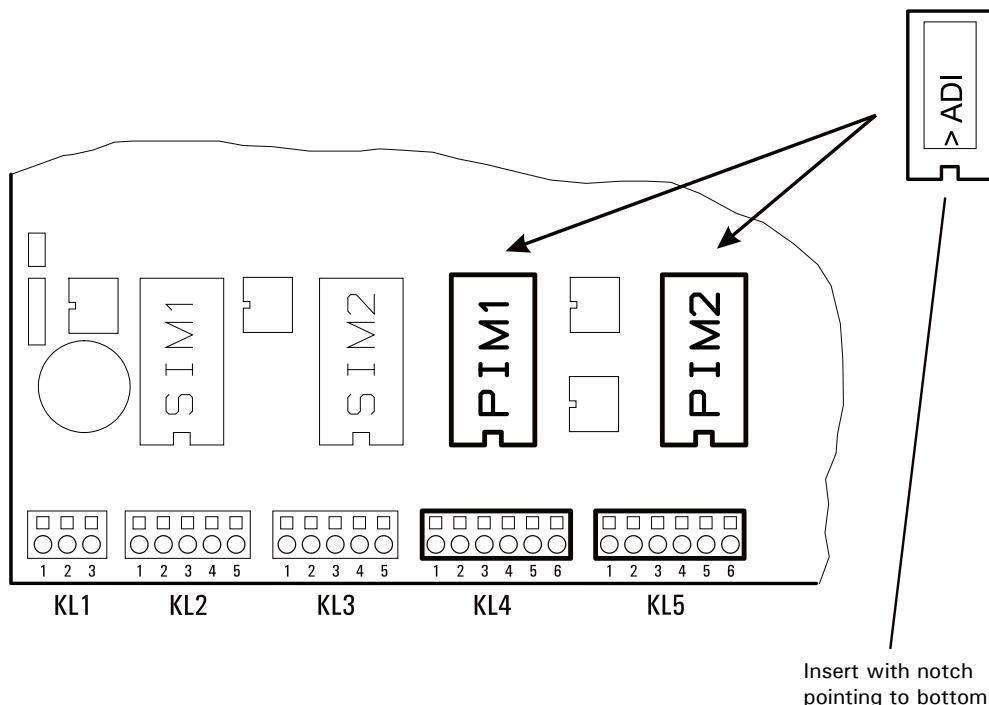


The impedance of the connected load must be equal or greater than 500 Ohm.

### 3.13 Connection Of 15-Bit Analog Input ADI

For the measurement of analog voltages or currents the plug-on module ADI can be installed in socket PIM1 or PIM2 (PIM3/4 on SPU). The module can be configured in 'Config.\Ain\ADI' of the Service Mode to 0/2–10 V or 0/4–20 mA. The input signal has a resolution of 15 bit (32768 steps). The input of the ADI module is potential free.

**Installing the ADI in a PIM socket on the mainboard**



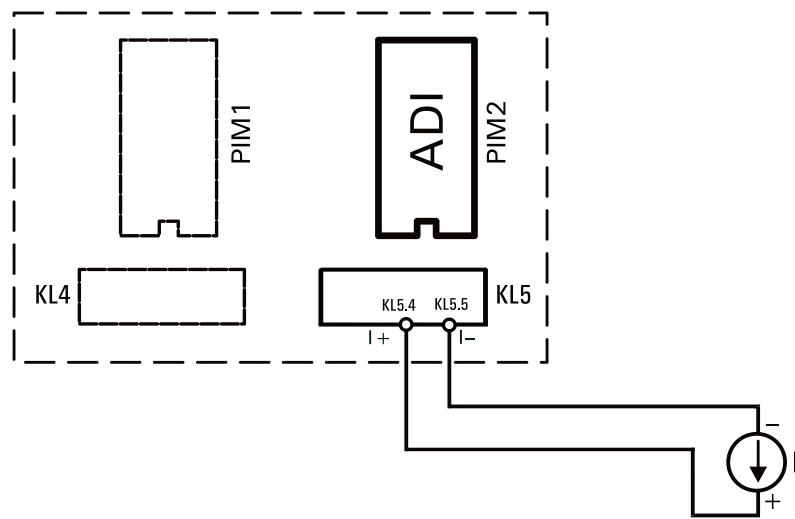
**Terminal assignment of ADI:**

		<b>ADI in socket:</b>	<b>PIM1</b>	<b>PIM2</b>
I+	+ Current input 0/4–20 mA	KL5.2	KL5.4	
I-	– Current input 0/4–20 mA	KL5.3	KL5.5	
U+	+ Voltage input 0/2–10 V	KL4.3	KL4.5	
U-	– Voltage input 0/2–10 V	KL4.4	KL4.6	

The impedance of the current input is  $24 \Omega$ .

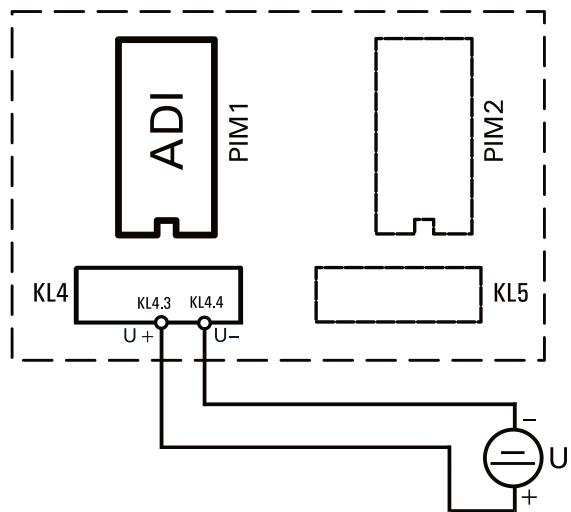
The impedance of the voltage input is  $105 \text{ k}\Omega$ .

**Example for current input 0/4–20 mA (ADI in socket PIM2):**



The impedance of the current input is  $R_i = 24 \text{ Ohm}$ .

**Example for voltage input 0/2–10 V (ADI in socket PIM1):**



The impedance of the voltage input is  $R_i = 105 \text{ kOhm}$ .

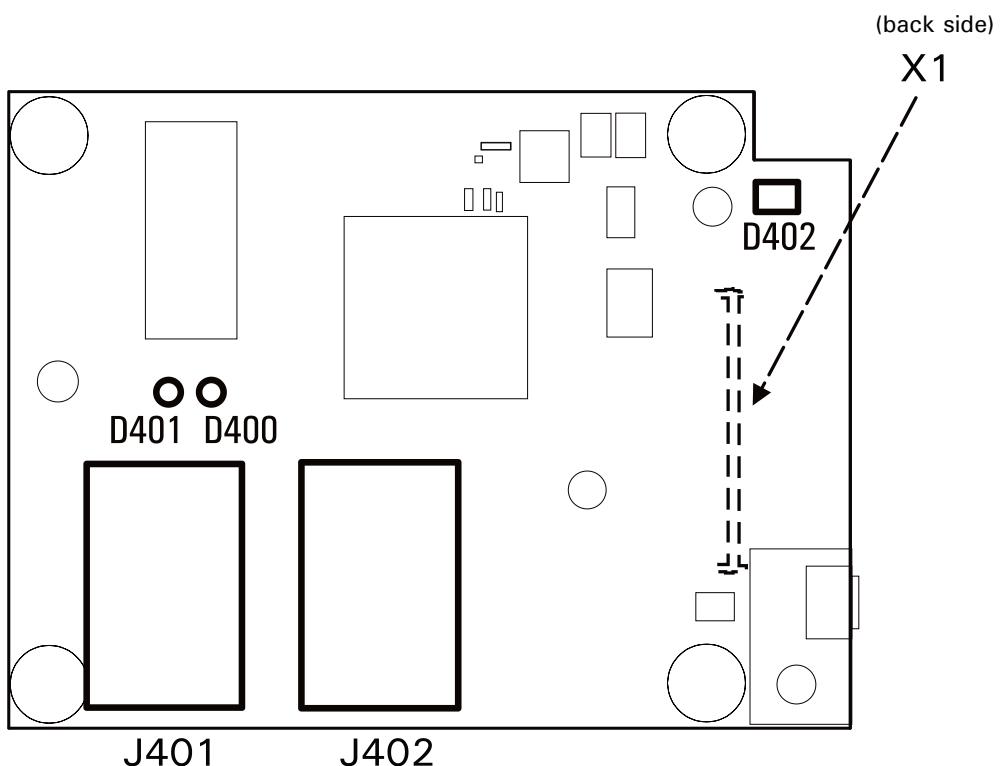
### 3.14 Connection Of Ethernet/IP-Module ETX

The extension module ETX enables the connection of the weighing terminal to Ethernet/IP networks.

Two RJ45 sockets are available for the connection to an Ethernet/IP network. They can be used to configure both, star or linear topology.

The internal switch required for linear topology is included in the ETX circuitry.

**Connections on ETX module**



**Connector X1**

Connector ETX	Socket mainboard
X1	X26

**Socket J401, J402**

Socket ETX	Ethernet/IP
J401	RJ45 line 1
J402	RJ45 line 2

### 3.14.1 External Connection Ethernet/IP

Connection to local 10/100 MBit Ethernet/IP networks is made with one of the following cables with RJ45 connector (plugged internally into J401 and/or J402 on the ETX board);

- 10KAB405, Ethernet cable 5 m with EMC cable gland and RJ45 connector;
- 10KAB410, Ethernet cable 10 m with EMC cable gland and RJ45 connector;
- 10KAB420, Ethernet cable with one EMC cable Glands and RJ45 connector, customized length, to be specified.

**Note:**

- Cable length of one segment without repeater (switch) max. 80 m;
- The required EMC cable gland is available under art. No. 10KAB422.

When assembling your own cables, the shield of the cable must be connected inside the cable gland as shown below:



- Strip approx. 10 mm of cable jacket where cable gland is to be installed;
- Run cable through cable gland until shield of cable has reached the contact position;
- Tighten cable gland.

### 3.14.2 Status LEDs

**Module status LED:**

**D402 (green)**

State	Indication
<b>Off</b>	Not activated in Service Mode
<b>Flashing</b>	No active Ethernet/IP connection
<b>On</b>	Ethernet/IP active

**Ethernet/IP status LEDs:**

**D400 System Failure (red/green)**

State	Indication
<b>red</b>	System error
<b>green</b>	System has been started

**D401 Bus Failure (red/green)**

State	Indication
<b>red</b>	No active connection
<b>green</b>	Connection to I/O IO controller active

### 3.14.3 Configuration Ethernet/IP

The Ethernet/IP module is activated in the Service Mode under 'Config\Fieldbus\Ethernet/IP'.

The IP address of the Ethernet/IP module is set in the PLC and not in the weighing terminal.

With the ETX extension module the weighing terminal works as Ethernet/IP unit, providing an I/O interface with up to 64 input words and up to 64 output words. The ETX module supports transmission speeds of up to 100 MBit/s. The contents of the individual data words is defined in the application program and described in the pertaining operation manual.

To configure the Ethernet/IP controller, an EDS file is required that you can download from our website '[www.systecnet.com](http://www.systecnet.com)'.

- Follow the link 'Service' and then 'Download Software'.

Download Software		
Datei	Dateigröße	Beschreibung
<a href="#"> EtherPort Tool 3.5.2.zip</a>	(4.7MB)	IP-Konfiguration SysTec Ethernet
<a href="#"> GSD.zip</a>	(39kb)	GSD Dateien Profibus DP
<a href="#"> GSDML-V2.2-SysTec_GmbH_0241-IT8000E-20121124.zip</a>	(5kb)	PROFINET GSDML IT8000E PNU
<a href="#"> GSDML-V2.31-SysTec_GmbH_0241-ITx000(E)(M)-20150203.zip</a>	(3kb)	PROFINET GSDML (Nicht PNU)
<a href="#"> IT2M046C.zip</a>	(3kb)	GSD IT2000M Profibus DP
<a href="#"> IT4000E_app_20150427.01.update</a>	(433kb)	IT4000E Applikations Firmware
<a href="#"> PC_Remote_Display_2.0.ZIP</a>	(753kb)	PC Remote Display
<a href="#"> Systec_NETX_51-RE_EIS_V1_1.zip</a>	(8kb)	Ethernet/IP - EDS Datei (ETX/ETU2000M)
<a href="#"> V3_20141125.1.IT468E.update</a>		Link in neuem Tab öffnen Link in neuem Fenster öffnen Link in neuem privaten Fenster öffnen
<a href="#"> V3_20141125.1.IT9E.update</a>		Lesezeichen für diesen Link hinzufügen Link teilen
<a href="#"> V3_20141125.1.ITxE_Sim.update</a>		Ziel speichern unter... C Simulator E, IT6000E, IT8000E mit

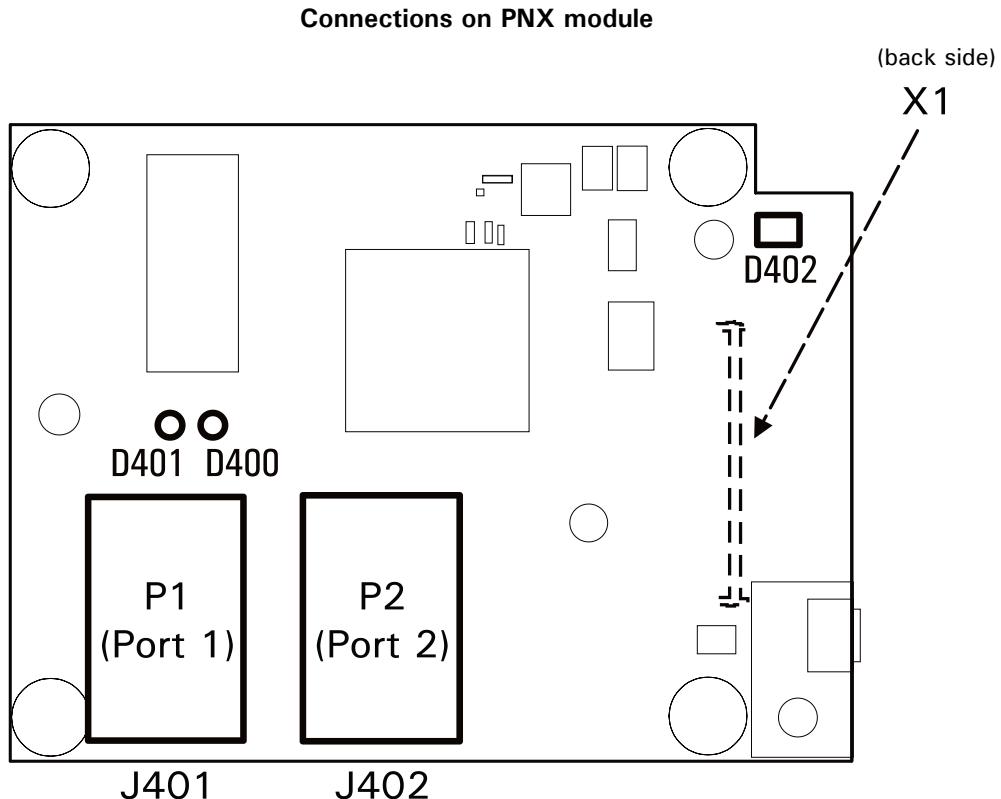
- Download the file 'Systec\_NETX....zip' (click right on the link and choose 'Save target as'). Unzip file on your hard disk.

### 3.15 Connection Of PROFINET Module PNX

The extension module PNX enables the connection of the weighing terminal to PROFINET networks.

Two RJ45 sockets are available for the connection to a PROFINET network. They can be used to configure both, star or linear topology.

The internal switch required for linear topology is included in the PNX circuitry.



**Connector X1**

Connector PNX	Socket mainboard
X1	X26

**Socket J401, J402**

Socket PNX	PROFINET
J401	RJ45 line 1
J402	RJ45 line 2

### 3.15.1 External Connection PROFINET

Connection to local 10/100 MBit PROFINET networks is made with one of the following cables with RJ45 connector (plugged internally into X2 and/or X3 on the PNU board);

- 10KAB440, Profinet cable 5 m with EMC cable gland and RJ45 connector;
- 10KAB441, Profinet cable 10 m with EMC cable gland and RJ45 connector;
- 10KAB442 + 10KAB443 or 10KAB442 + 10KAB444, Profinet cable with one or two EMC cable glands and RJ45 connector, customized length, to be specified.

**Note:**

- Cable length of one segment without repeater (switch) max. 80 m;
- The required EMC cable gland is available under art. No. 10KAB422.

When assembling your own cables, the shield of the cable must be connected inside the cable gland as shown below:



- Strip approx. 10 mm of cable jacket where cable gland is to be installed;
- Run cable through cable gland until shield of cable has reached the contact position;
- Tighten cable gland.

### 3.15.2 Status LEDs

**Module status LED:**

**D402 (green)**

State	Indication
Off	Not activated in Service Mode
Flashing	No active PROFINET connection
On	PROFINET active

**PROFINET status LEDs:**

**D400 System Failure (red/green)**

State	Indication
red	System error
green	System has been started

**D401 Bus Failure (red/green)**

State	Indication
red	No active PROFINET connection
green	PROFINET connection to I/O IO controller active

### 3.15.3 PROFINET Configuration

The PROFINET module is activated in the Service Mode under 'Config\Fieldbus\PROFINET'.

The IP address of the PROFINET module is set in the PLC and not in the weighing terminal.

With the PNX extension module the weighing terminal works as PROFINET I/O unit, providing an I/O interface with up to 64 input words and up to 64 output words. The PNU module supports transmission speeds of up to 100 MBit/s. The contents of the individual data words is defined in the application program and described in the pertaining operation manual.

To configure the PROFINET I/O controller, a GSDML file is required that you can download from our website '[www.systecnet.com](http://www.systecnet.com)'.

- Follow the link 'Service' and then 'Download Software'.

download software		
File	Filesize	Description
<a href="#"> EtherPort Tool 3.5.2.zip</a>	(4.7MB)	SysTec Ethernet IP configuration
<a href="#"> GSD.zip</a>	(50kb)	GSD Files Profibus DP
<a href="#"> GSDML.zip</a>	(21kb)	GSDML Files PROFINET
Open link in new tab		Application Firmware
Open link in new window		Application Firmware
Open link in incognito window		note Display
Save link as...		P - EDS File (ETX/ETU2000M)
Copy link address		IT4000E, IT6000E, IT8000E with Certificate Id 3
Inspect element	Ctrl+Shift+I	IT9000E

- Download the file 'GSDML.zip' (click right on the link and choose 'Save Target/Link as'). Unzip file on your hard disk.

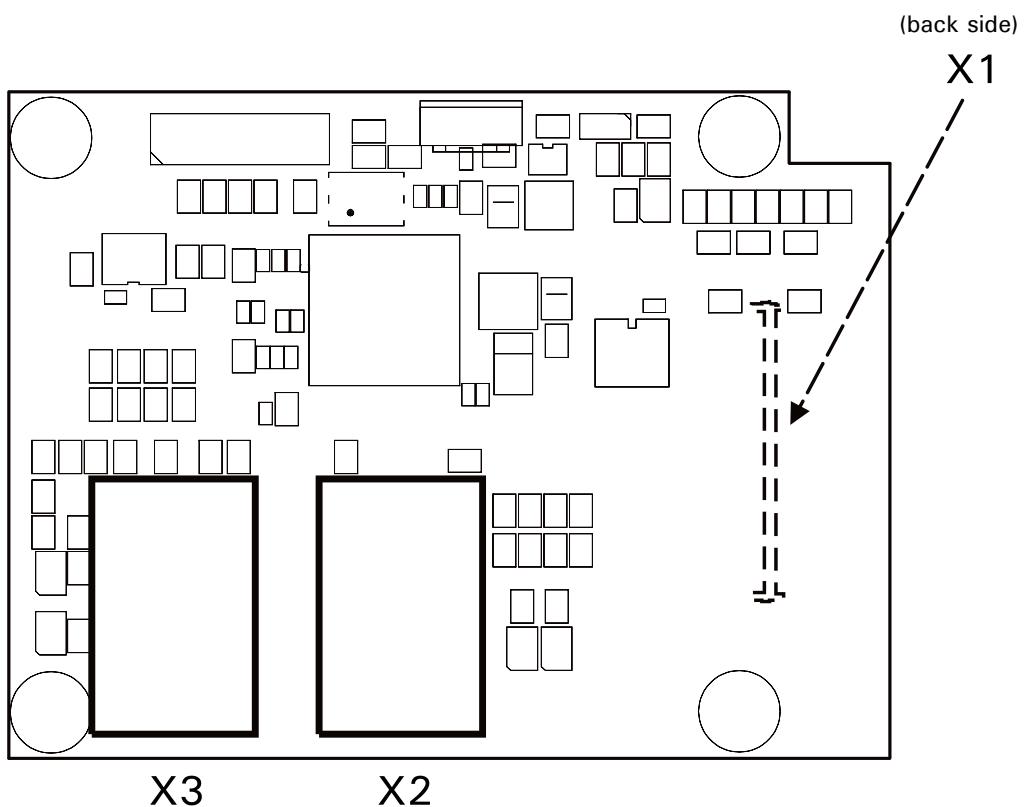
### 3.16 Connection Of PROFINET Module PNU

The extension module PNU enables the connection of the weighing terminal to PROFINET networks.

Two RJ45 sockets are available for the connection to a PROFINET network. They can be used to configure both, star or linear topology.

The internal switch required for linear topology is included in the PNU circuitry.

**Connections on PNU module**



**Connector X1**

Connector PNU	Socket mainboard
X1	X26

**Socket X2, X3**

Socket PNU	PROFINET
X2	RJ45 line 1
X3	RJ45 line 2

### 3.16.1 External Connection PROFINET

Connection to local 10/100 MBit PROFINET networks is made with one of the following cables with RJ45 connector (plugged internally into X2 and/or X3 on the PNU board);

- 10KAB440, Profinet cable 5 m with EMC cable gland and RJ45 connector;
- 10KAB441, Profinet cable 10 m with EMC cable gland and RJ45 connector;
- 10KAB442 + 10KAB443 or 10KAB442 + 10KAB444, Profinet cable with one or two EMC cable glands and RJ45 connector, customized length, to be specified.

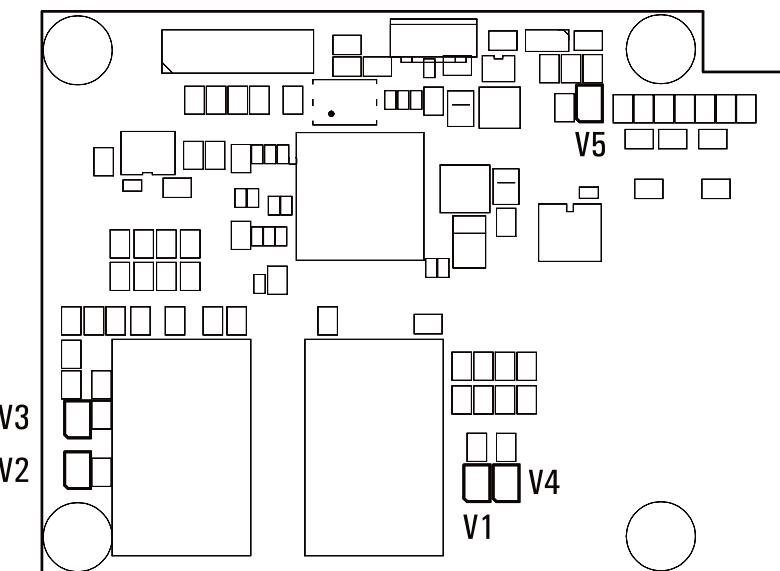
**Note:**

- Cable length of one segment without repeater (switch) max. 80 m;
- The required EMC cable gland is available under art. No. 10KAB422.

When assembling your own cables, the shield of the cable must be connected inside the cable gland as shown below:



- Strip approx. 10 mm of cable jacket where cable gland is to be installed;
- Run cable through cable gland until shield of cable has reached the contact position;
- Tighten cable gland.

**Module status LED:****V5 (green)**

State	Indication
Off	Not activated in Service Mode
Flashing	No active PROFINET connection
On	PROFINET active

**PROFINET status LEDs:****V1 maintenance (yellow)**

State	Indication
Off	Maintenance not required
On	Maintenance required

**V2 system fail (red)**

State	Indication
Off	PROFINET diagnosis available
On	No PROFINET diagnosis available

**V3 bus failure (red)**

State	Indication
Off	Error / not configured (when terminal is switched on)
Flashing	PROFINET connection active, no communication with another PROFINET I/O controller
On	Profibus connection active

**V4 device ready (green)**

State	Indication
Off	PNU module not correctly initialized
Flashing	Waiting on connection to CPU8000E module
On	PNU module correctly initialized

### 3.16.2 PROFINET Configuration

The PROFINET module is activated in the Service Mode under 'Config\Fieldbus\PROFINET'.

The IP address of the PROFINET module is set in the PLC and not in the weighing terminal.

With the PNU extension module the weighing terminal works as PROFINET I/O unit, providing an I/O interface with up to 64 input words and up to 64 output words. The PNU module supports transmission speeds of up to 100 MBit/s. The contents of the individual data words is defined in the application program and described in the pertaining operation manual.

To configure the PROFINET I/O controller, a GSDML file is required that you can download from our website '[www.systecnet.com](http://www.systecnet.com)'.

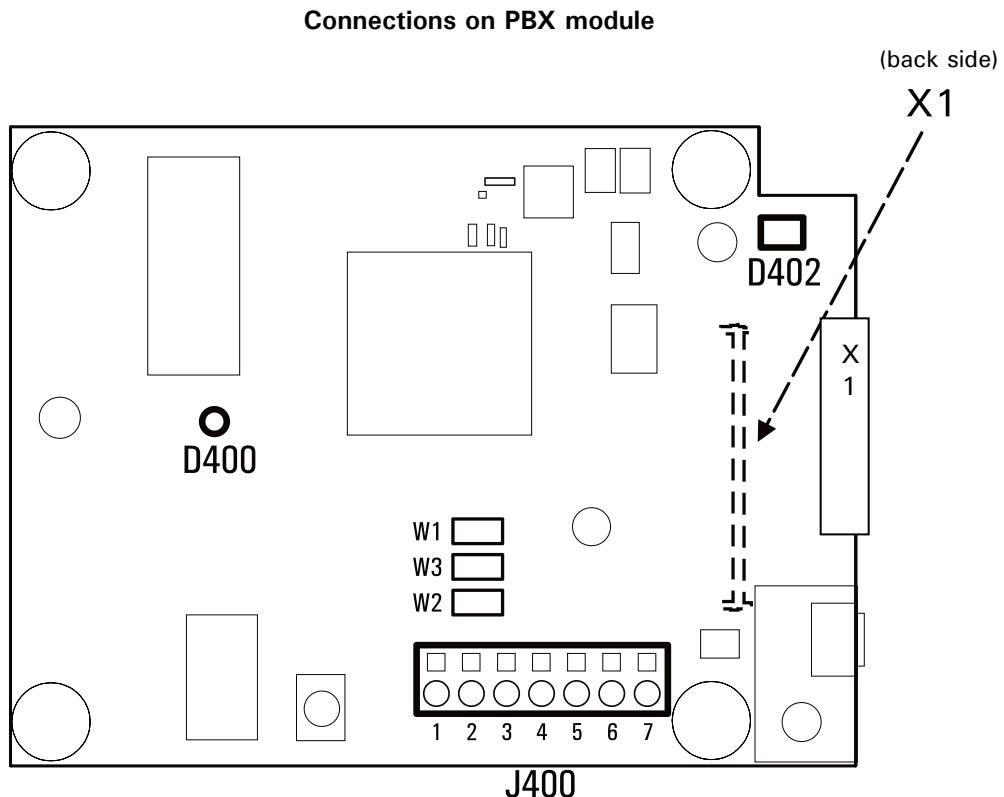
- Follow the link 'Service' and then 'Download Software'.

download software		
File	Filesize	Description
<a href="#"> EtherPort Tool 3.5.2.zip</a>	(4.7MB)	SysTec Ethernet IP configuration
<a href="#"> GSD.zip</a>	(50kb)	GSD Files Profibus DP
<a href="#"> GSDML.zip</a>	(21kb)	GSDML Files PROFINET
Open link in new tab		Application Firmware
Open link in new window		Application Firmware
Open link in incognito window		note Display
Save link as...		P - EDS File (ETX/ETU2000M)
Copy link address		IT4000E, IT6000E, IT8000E with Certificate Id 3
Inspect element	Ctrl+Shift+I	IT9000E

- Download the file 'GSDML.zip' (click right on the link and choose 'Save target/link as'). Unzip file on your hard disk.

### 3.17 Connection Of Profibus Module PBX

The PBX expansion board provides connection of the weighing terminal to the Profibus DP field bus.



**Connector X1**

Connector PBX	Socket mainboard
X1	X26

**Terminal assignment J400**

J400	Profibus DP
1	RTS
2	Gnd 5V
3	+ 5V
4 / 6	B Line
5 / 7	A Line

#### 3.17.1 Status LEDs

**LED D402**

State	Indication
Off	Error / Not activated in Service Mode
Flashing	No active Profibus connection
On	Profibus connection active

**PROFIBUS-Status LEDs:****D400 System Failure (red/green)**

State	Indication
red	System error
green	System has been started

**Function of jumpers W1–W3**

Jumper	Profibus DP interface
W1	Pull-up resistor
W2	Termination resistor
W3	Pull-down resistor

If the terminal is connected to a physical end of the Profibus DP bus, the jumpers W1, W2 and W3 must be set to terminate the bus. The line is terminated when the jumpers are closed.

### 3.17.2 Configuration of Profibus DP

The Profibus address is set in Service Mode (see also Installation Instructions of application program). With the PBX expansion module the weighing terminal operates as a Profibus DP slave, with an I/O interface (up to 64 inputs and outputs) or a data interface with up to 64 input words and up to 64 output words. The PBX module is designed for transmission speeds of 12 MBit/s. The definition of the individual data words depends on the application and is specified in the Installation Instructions pertaining to the respective product.

For the configuration of the Profibus master, a GSD file is required that you can download from our website '[www.systecnet.com](http://www.systecnet.com)'.

- Follow the link 'Service' and from there to 'download software'.

**download software**

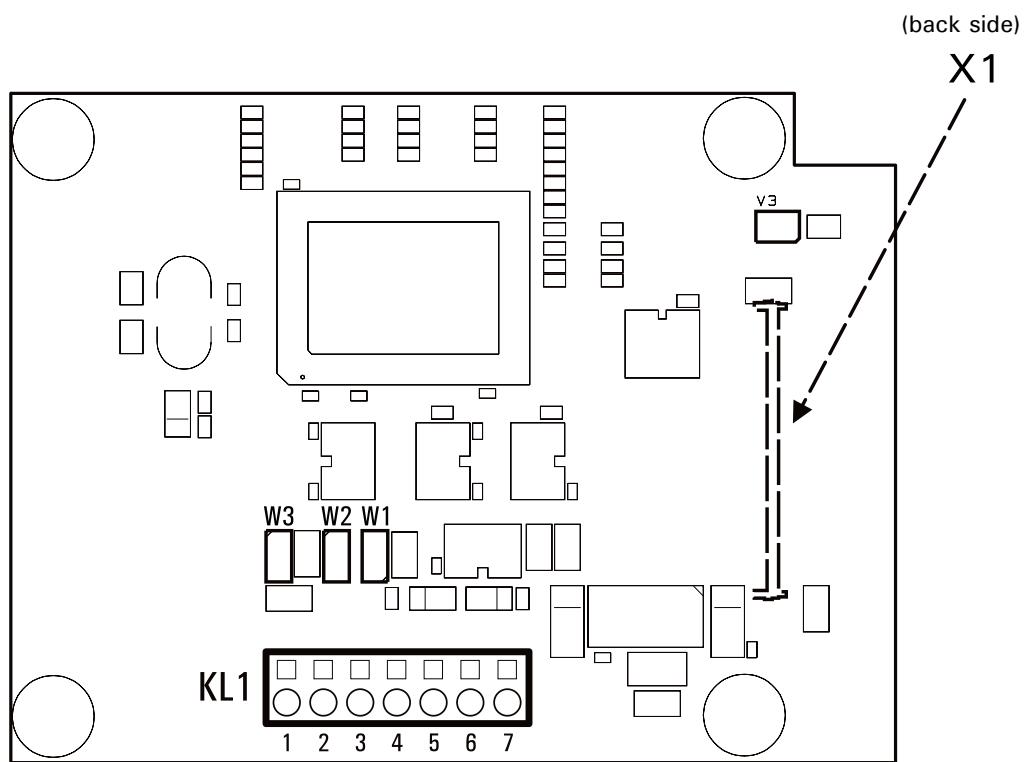
File	Filesize	Description
<a href="#">EtherPort Tool 3.5.2.zip</a>	(4.7MB)	SysTec Ethernet IP configuration
<a href="#">GSD.zip</a>	(50kb)	GSD Files Profibus DP
<a href="#">Open link in new tab</a>		Files PROFINET
<a href="#">Open link in new window</a>		Application Firmware
<a href="#">Open link in incognito window</a>		Application Firmware
<a href="#">Save link as...</a>		Site Display
<a href="#">Copy link address</a>		P - EDS File (ETX/ETU2000M)
<a href="#">Inspect element</a>	Ctrl+Shift+I	IT4000E, IT6000E, IT8000E with Certificate Id
<a href="#">V3_20150714.1.IT9E.update</a>	(3.3MB)	Firmware IT9000E

- Download the file 'GSD.zip' (click right on the link and choose 'Save target/link as'). Unzip file on your hard disk.

### 3.18 Connection Of Profibus Module PBU

The PBU expansion board provides connection of the weighing terminal to the Profibus DP field bus.

**Connections on PBU module**



Connector PBU	Socket mainboard
X1	X26

**Terminal assignment Profibus DP interface:**

KL1	Profibus DP
1	RTS
2	Gnd 5V
3	+5V
4 / 6	B Line
5 / 7	A Line

**LED Profibus interface V3:**

Off	Error / Not activated in Service Mode
Flashing	No active Profibus connection
On	Profibus connection active

### Function of jumpers W1–W3

Jumper	Profibus DP interface
W1	Pull-up resistor
W2	Termination resistor
W3	Pull-down resistor

If the terminal is connected to a physical end of the Profibus DP bus, the jumpers W1, W2 and W3 must be set to terminate the bus. The line is terminated when the jumpers are closed.

### 3.18.1 Configuration of Profibus DP

The Profibus address is set in Service Mode (see also Installation Instructions of application program). With the PBU expansion module the weighing terminal operates as a Profibus DP slave, with an I/O interface (up to 64 inputs and outputs) or a data interface with up to 64 input words and up to 64 output words. The PBU module is designed for transmission speeds of 12 MBit/s. The definition of the individual data words depends on the application and is specified in the Installation Instructions pertaining to the respective product.

For the configuration of the Profibus master, a GSD file is required that you can download from our website '[www.systecnet.com](http://www.systecnet.com)'.

- Follow the link 'Service' and from there to 'download software'.

**download software**

File	Filesize	Description
<a href="#">EtherPort Tool 3.5.2.zip</a>	(4.7MB)	SysTec Ethernet IP configuration
<a href="#">GSD.zip</a>	(50kb)	GSD Files Profibus DP
<a href="#">Open link in new tab</a>		Files PROFINET
<a href="#">Open link in new window</a>		Application Firmware
<a href="#">Open link in incognito window</a>		Application Firmware
<a href="#">Save link as...</a>		Configure Display
<a href="#">Copy link address</a>		P - EDS File (ETX/ETU2000M)
<a href="#">Inspect element</a>	Ctrl+Shift+I	IT4000E, IT6000E, IT8000E with Certificate Id
<a href="#">V3_20150714.1.IT9E.update</a>	(3.3MB)	Firmware IT9000E

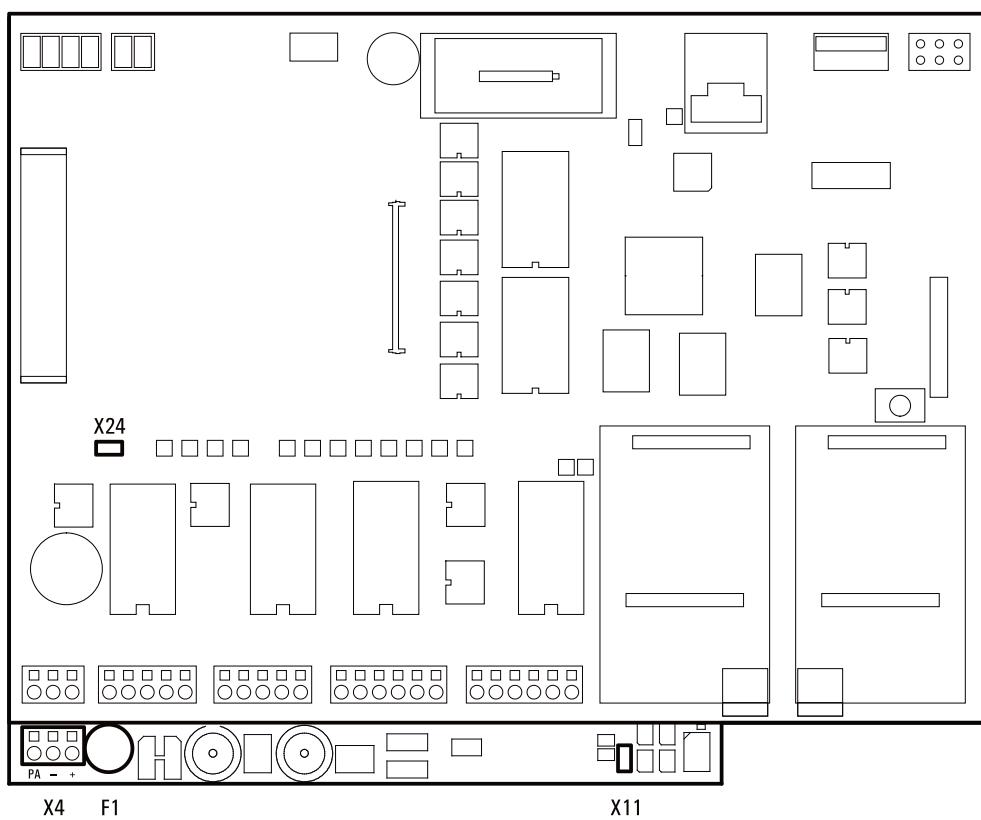
- Download the file 'GSD.zip' (click right on the link and choose 'Save target/link as'). Unzip file on your hard disk.

### 3.19 Connection To Power Supply 12–30 VDC

IT8000ET is intended for connection to a supply voltage of 12 VDC (-15 %) to 30 VDC (+10 %). The external voltage is connected at terminal X4 on the basic board PTA (Power-Supply-Touch-Adapter). This board contains a DC/DC converter (30 W, 12–30 VDC input / 12 VDC output), the connection to the touch screen with LVDS converter and the monitoring of the battery charge state. The board has a fused input (2 A T). A diode serves as protection against polarity reversal.

Terminal assignment X4

X4	Assignment
PA	Gnd (housing)
-	0 VDC
+	+ 12 VDC to + 30 VDC



### 3.20 Enable On/Off Switch



The jumper X11 on the lower basic board PTA determines the function of the on/off switch:

Jumper X11 inserted:

On/off switch disabled, when connected to power supply the terminal starts immediately.

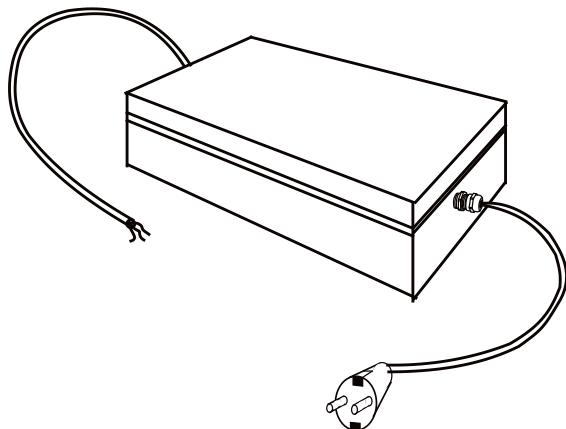
Jumper X11 removed:

The terminal only starts after pressing the on/off switch.

The jumper X24 on the upper mainboard needs to be always connected!

### 3.21 ITX000ET External Power Supply 110–240 VAC (T8PWS001)

'ITX000ET Externes Netzteil' (external power supply) is suitable for the supply of the IT8000ET weighing terminal. For connection to the 110–240 VAC mains supply it has a line cord with safety plug. The output voltage of 12 VDC is available at a 2-core cable of 1 m length with free ends and can be connected at the input terminals X4 of the IT8000ET weighing terminal.



Technical data and assignment:

<b>Input:</b>	
Input voltage:	110–240 VAC / 47–63 Hz; 0.4-0.2 A
Connection:	Line cord of 2.5 m length with safety plug
<b>Output:</b>	
Output voltage:	12 VDC; 2.0 A
Connection:	2-core cable of 1 m length, color code: brown: +12 VDC white: 0 VDC

Safety advice:

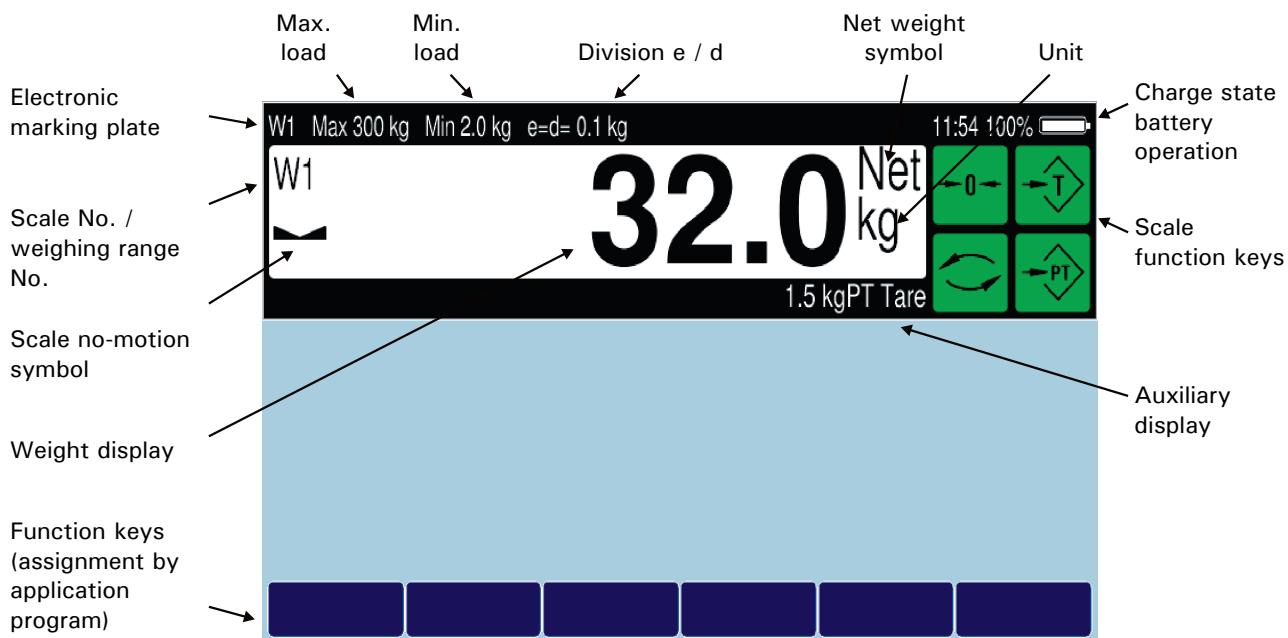
- Input voltage of the unit must comply with local mains supply: 110–240 VAC / 47–63 Hz.
- The mains supply of the unit should not be used at the same time for machines or equipment that can cause interference (e.g. motors, relays, heaters, etc.). Even short spikes or interruptions may affect the function of the unit or cause damage. An uninterruptable power supply (UPS) can prevent problems of this nature.
- Mains supply is made via a factory-installed line cord of 2.5 m length with safety plug. Make sure that wall outlet is correctly grounded!
- The wall outlet must be installed close to the unit and must be easily accessible!
- The device uses the short-circuit / overcurrent protection of the on-site mains supply.



#### W A R N I N G

Parts of the power supply unit – in particular the heat sinks – are directly connected to dangerously high voltages! A defective power supply unit cannot be repaired it can only be replaced. Disconnect all power to the unit before servicing!

## 4 Weight Display And Scale Function Keys



Please note that 'key' refers to the corresponding sensor field of the currently displayed template, in the same way 'pressing a key' is to be understood as touching the respective field of the touch panel.

### Scale Function Keys

-  **Set Zero Key** to set the displayed scale to zero (only within zero setting range, selectable in calibration mode). \*<sup>1</sup>
-  **Key to switch auxiliary display** between tare weight / gross weight / bargraph / weight storage / WLAN connection / Firmware Information / Monitor options
-  **Tare Key** for alternately taring of currently displayed weight or clearing the tare weight. \*<sup>1</sup>
-  **Tare entry key** to enter preset tare in the tare line, the value is applied after confirmation with the Enter-key. \*<sup>1</sup>

\*<sup>1</sup> Function can be disabled in application program.

### Electronic Marking Plate (only for single- and dual-range and two-interval scales)

**Note:** The electronic marking plate is blanked when parameter 'Service Mode\Calibration\Adaptation\Onscreen typeplate = N' is set, it is also blanked for certain types of scale platforms.

<b>Scale No.</b>	W1 ... W8	No. of scale selected via Scale Select Key.
<b>Max Load</b>	e.g.: Max 3000 kg	Maximum load (without additive tare), selectable in calibration mode.
<b>Min Load</b>	e.g.: Min 20 kg	Permissible minimum load.
<b>Division e / d</b>	e.g.: e=d=1 kg	Approved division e and display graduation d (in most cases e = d).

### Weight Display

<b>Scale No. / No. Of Weighing Range</b>	W1 ... W8 W1.1 ... W8.3	No. of scale selected via Scale Select Key partial weighing range for multiple-range scales.
<b>No-Motion Symbol</b>		Settled weight (printing / storing possible).
<b>Zero Symbol</b>	>0<	Scale in gross zero range ( $\pm 0.2$ d)
<b>Gross Weight Or Net Weight</b>	e.g. 1250 e.g. 650 Net	Switching from gross weight to net weight with Tare-key.
<b>Net Weight Symbol</b>	Net	Scale is tared.
<b>Unit</b>	e.g. kg	Weight unit, selectable in calibration mode.

**Auxiliary Display (switchable via Display Select Key)**

<b>Tare</b>	<b>12.9 kgT</b>	Display of tare weight
<b>Gross</b>	<b>1000 kg</b>	Display of gross weight
		Gross weight bargraph (zero to max load)
<b>Approved weight storage</b>		W&M approved data archive (see chapter 'Data Archive')
<b>WLAN connected with &lt;SSID&gt;</b>		WLAN connected with 'Network name'
<b>WLAN signal power III (-57 dBm)</b>		WLAN signal power
<b>Firmware information</b>		Show details of firmware version, Enter Master Mode
<b>Monitor options</b>		Adjusting the contrast of the display

**Example for firmware information:**

## 4.1 General Operation



Back to previous program step or previous line

Scrolling in records / columns of tables,  
scrolling of lines right / left in edit functions

Switching to layout of alphanumeric keyboard

Switching to layout of numeric keyboard

Shift-key for capital letters

Delete characters

Enter-key

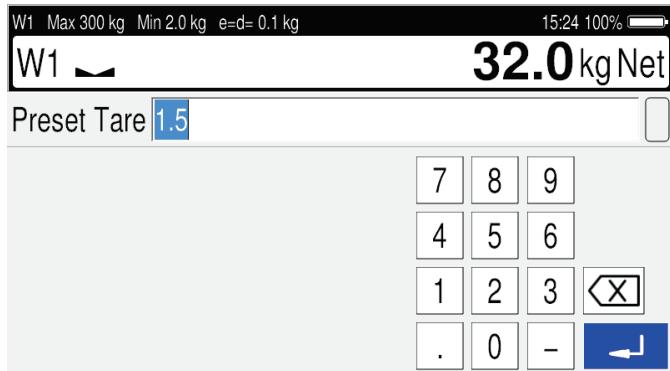
Special characters can be entered by pressing and holding one of the following keys; A, C, E, I, O, S, U, Y, and a, c, e, i, o, s, u, y

### Confirmation of Entry / Choice of Function

Every entry or choice of parameter or function must be confirmed with the Enter-key, even if this is not explicitly stated in the following text. After pressing the Enter-key the program is continued in the next step.

## 4.2 Operation Of Scale Functions

### Preset Tare (PT)



After pressing the PT-key, the template for numeric inputs is displayed and a tare value can be entered and confirmed with the Enter-key.

### Indication of net weight in the main display and gross weight in the auxiliary display.



By pressing the Tare-key the tare is cleared and the main display returns to the indication of the gross weight.

### Tare Balancing



By pressing the Tare-key, tare balancing is executed. By pressing the Tare-key once more the display returns to gross weight.

## 5 Service Mode

### 5.1 General

The Service Mode is a program for configuration, calibration and hardware test of the weighing terminal. Also, data can be backed up onto a PC.

#### Notes:

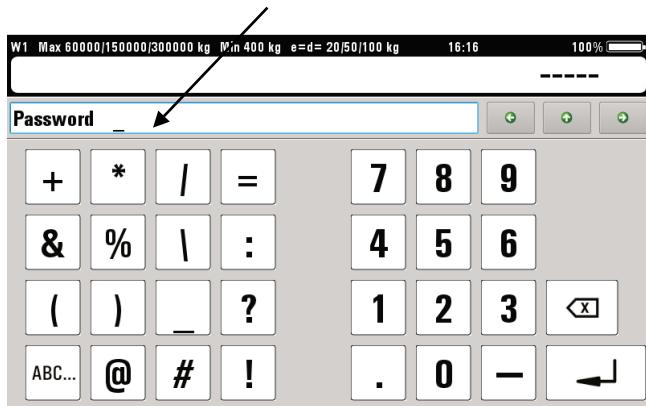
- This weighing terminal and its associated equipment must be installed, adjusted and maintained by qualified personnel only!
- Before accessing the Service Mode all peripheral devices must be installed and configured!
- Access to the Service Mode is protected by the Service Password (see also last page of this manual).
- Inappropriate changes of Service Mode settings may lead to malfunction and errors in the operating sequence!

### 5.2 Access To Service Mode

The Service Mode is called up by touching the field of the weight display for at least 2 sec.



Service Mode entries are made in the Info-line.



ID: 99999999 / V9.99

Show ident No. of operating system and version of W&M approved software for 2 sec and continue.

Password      ????

Entry of password (4 digits)



Back to normal operation



Show ID / MAC address / IP Address / Serial number

**Wrong password:**

Invalid Password!

Repeat entry of password

**Service Mode options:**

Use arrow-keys left/right to scroll through groups.



Choose displayed group.

Service: Interface

Configure interfaces;  
(see chapter 'Interface Configuration')

Service: General

Enter setup parameters: language, format of date, etc.  
(see chapter 'Entry Of Parameters (General)')

Service: Calibration

Calibrate scale;  
(see chapter 'Calibration Mode')

Service: Config.

Configure scale, digital I/Os, analog outputs  
(see chapter 'Configuration')

Service: Test

Test hardware;  
(see chapter 'Test (Hardware)')

Service: Reset

Load factory defaults;  
(see chapter 'Reset')

Service: Network

Make network settings;  
**Note:** This menu is only available with network connection.

Service: WLAN

Configure WLAN module;  
(see chapter 'WLAN')

Service: Licenses

Activate license for PC *ScaleView*  
(see chapter 'Licenses')

Service: Backup

Data backup and restoring  
(see chapter 'Backup')

When the Service Mode is exited the entered or changed parameters are stored.

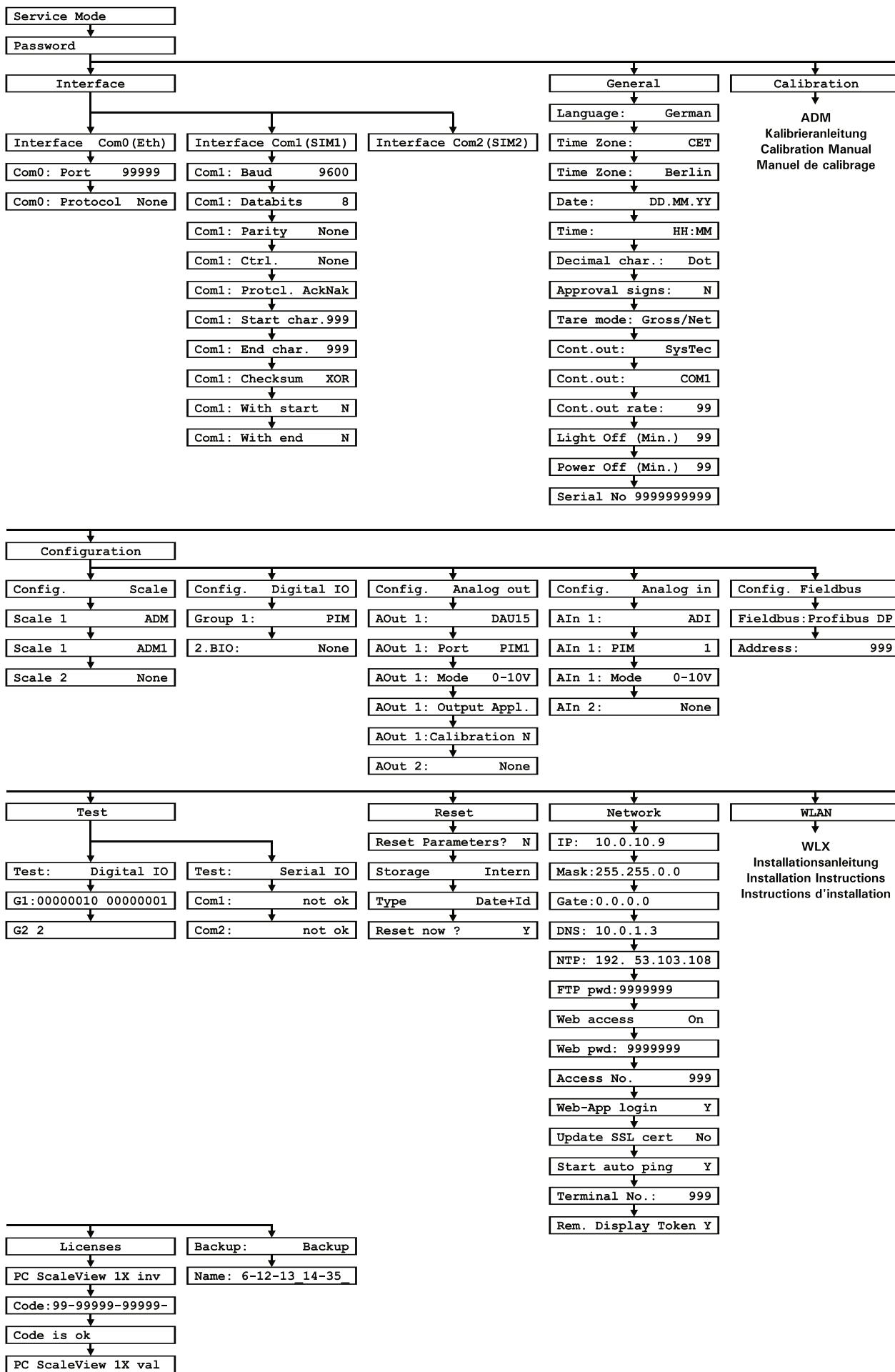
Saving...

Exit Service Mode and store changes, return to normal operation.

**CAUTION**

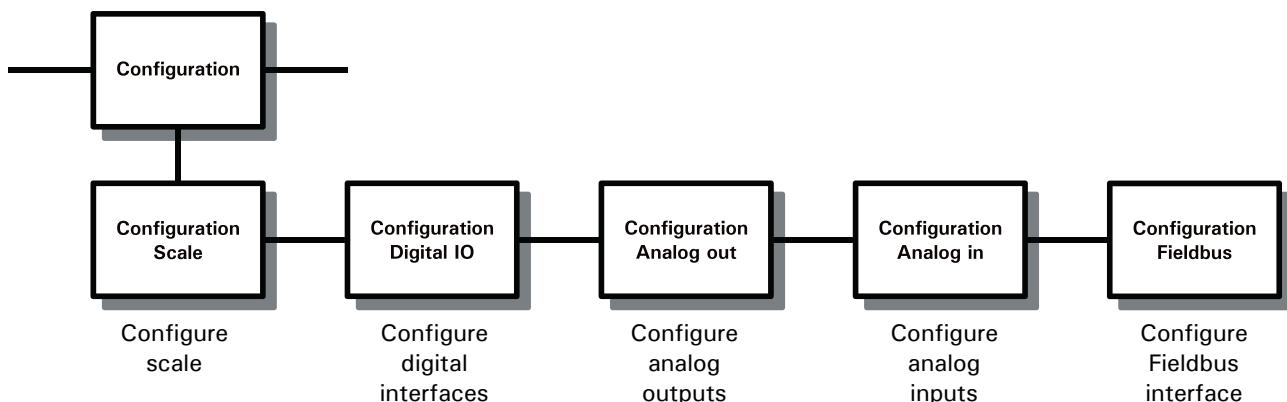
Under no circumstances switch off power while 'Saving...' is displayed, because that will inevitably destroy the contents of the Flash-EPROM and thus the program.

## 5.3 Overview Service Mode

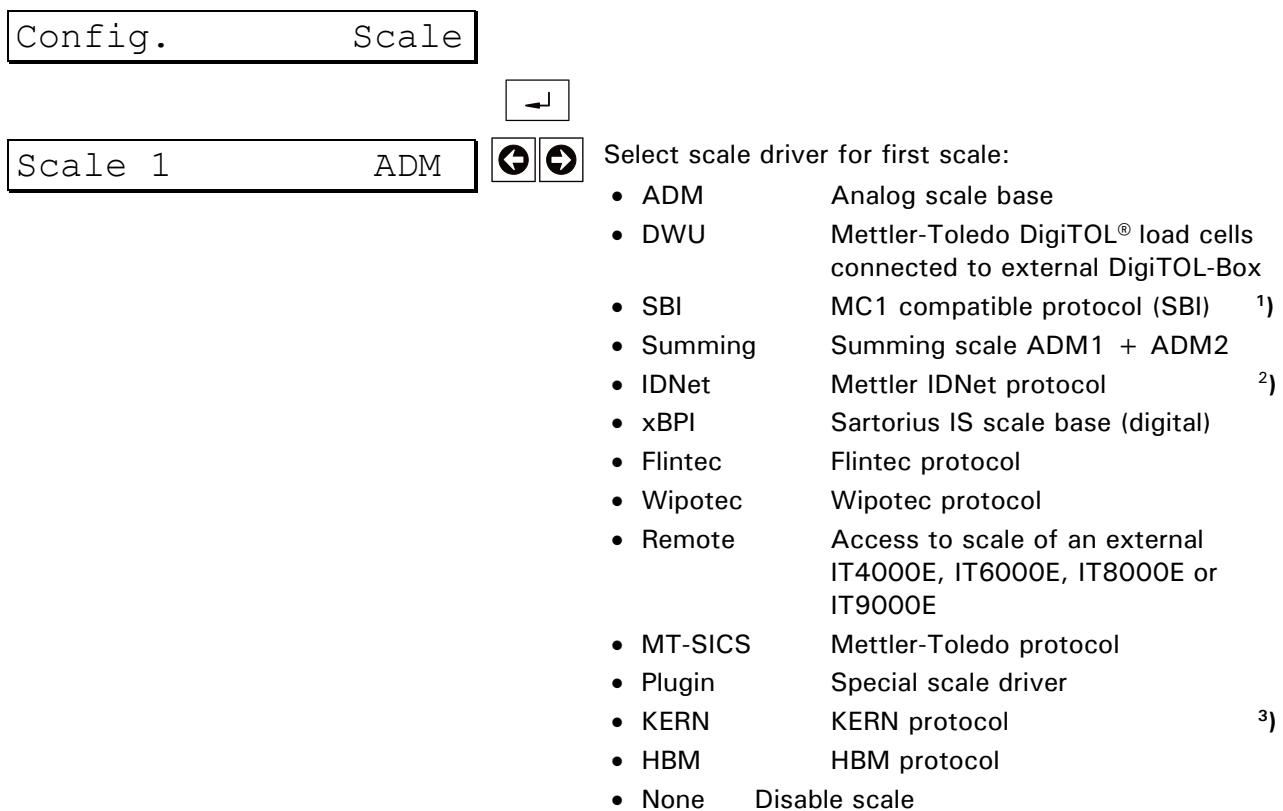


## 6 Configuration

Choose group 'Config.' from Service Mode menu.



### 6.1 Configure Scale



- <sup>1)</sup> Parameters of the Sartorius scale must be set to:  
MC1 protocol (SBI), 7 bit, odd parity, 1200 baud, RTS/CTS, streaming mode, 16-character data string.
- <sup>2)</sup> Intended for Mettler-Toledo scale bases with IDNet interface.
- <sup>3)</sup> Intended for KERN scales of series EW and DS.

**Not if 'Summing' or 'Remote' was chosen:**

### Scale 1

ADM1



### Select scale interface:

- ADM1 ADM in socket ADM1
  - ADM2 ADM in socket ADM2
  - SIM 1-x via serial interface
  - IDN1 IDN in socket ADM1
  - DWB1 DWB in socket ADM1
  - DWB2 DWB in socket ADM2

## Summing chosen:

Sum 1+2



Choose platforms for summing function:

- Sum  $1 + 2$
  - Sum  $1 + 3$
  - Sum  $2 + 3$
  - Sum  $1 + 2 + 3$

## Remote chosen:

IP 255.255.255.255



Enter IP address of the externally connected weighing terminal.

Port 99999

Enter port.

Scale 1 Scale No. 2

Assignment of internal scale to scale of the external weighing terminal:

e.g.: Scale #1 (internal) is assigned to scale #2 of external weighing terminal.

Scale 2 None

Continue with next scale,  
(if applicable)

#### Options for setting of scale driver:

	ADM1	ADM2	SIM1	SIM2	SIM3	SIM4	IDN1	DWB1	DWB2
ADM	<b>ADM</b>	<b>ADM</b>	<b>SIM</b>	<b>SIM</b>	<b>SIM</b>	<b>SIM</b>		<b>DWB</b>	<b>DWB</b>
DWU			<b>SIM</b>	<b>SIM</b>	<b>SIM</b>	<b>SIM</b>		<b>DWB</b>	<b>DWB</b>
SBI			<b>SIM</b>	<b>SIM</b>	<b>SIM</b>	<b>SIM</b>			
Summing									
IDNet			<b>SIM</b>	<b>SIM/IDN</b>	<b>SIM</b>	<b>SIM</b>	<b>IDN</b>		
xBPI								<b>DWB</b>	<b>DWB</b>
Flintec								<b>DWB</b>	<b>DWB</b>
Wipotec								<b>DWB</b>	
Remote									
MT-SICS			<b>SIM</b>	<b>SIM</b>	<b>SIM</b>	<b>SIM</b>			
Kern			<b>SIM</b>	<b>SIM</b>	<b>SIM</b>	<b>SIM</b>			
HBM								<b>DWB</b>	<b>DWB</b>

## 6.2 Configure Digital I/Os

Config.      Digital IO

Configure I/Os

Group 1:      PIM



Select type of digital I/Os:

- PIM Internal I/Os PIM1/PIM2
- REL/TRIO External relay / transistor module  
REL485/TRIO485 connected via serial interface
- Modbus TCP To control external I/O modules via Ethernet
- SIO I/O module in socket SIMx
- None Not applicable

**REL/TRIO or SIO selected:**

Group 1: Port      SIM1



Assignment to serial interface SIM1–SIMx

**Modbus TCP selected:**

IP

Enter IP address for the local net.

Group 2:      None

Continue with next I/O group.

## 6.3 Configure Analog Outputs

Config.      Analog out

Configure analog outputs

AOut 1:      MAI



Select analog output:

- MAI External analog output module
- DAU8 internal 8-bit analog output module
- DAU15 internal 15-bit analog output module
- None Not applicable

### 6.3.1 MAI Chosen

AOut 1: Port      SIM1



Select pertaining internal serial interface:

- SIM1–SIMx

AOut 1: Address      0



Select pertaining internal address:

- Address 0–Address 7  
equivalent MAI Address 16–Address 23

AOut 1: Module      X1



Select external MAI module:

- Module X1–Module X4

AOut 1: Mode      0–10V



Select type of output signal:

- 0–10 V, 2–10 V, 0–20 mA or 4–20 mA

AOut 1: Output Appl.



Select operating mode:

- Appl. Controlled by application program
- Gross Gross weight
- Net Net weight

**Gross or Net selected:**

AOut 1: Scale 1

Entry of scale for output of gross / net weight.

AOut 1: Calibration N



Calibration of output signal:

- N Skip and continue
- Y Calibrate output signal, connect multimeter

**Calibrate output signal (Calibration = Y):**

AOut 1: 0V = 0



Calibrate zero signal, e.g. =0 V.

Stepwise increase / decrease analog signal.

AOut 1: 10V = 255



Calibrate full signal, e.g. 10 V.

Stepwise increase / decrease analog signal.

**Note:** The calibrated values are overwritten when the type of the output signal is changed.

AOut 2: None

Continue with next analog output.

### 6.3.2 DAU15 Chosen

AOut 1: Port SIM1



Select pertaining internal digital interface:

- PIM1–PIMx

AOut 1: Mode 0–10V



Select type of output signal:

- 0–10 V, 2–10 V, 0–20 mA or 4–20 mA

AOut 1: Output Appl.



Select operating mode:

- Appl. Controlled by application program
- Gross Gross weight
- Net Net weight

**Gross or Net selected:**

AOut 1: Scale 1

Entry of scale for output of gross / net weight.

AOut 1: Calibration N



Calibration of output signal:

- N Skip and continue
- Y Calibrate output signal, connect multimeter

**Calibrate output signal (Calibration = Y):**

AOut 1: 0V = 6928



Calibrate zero signal, e.g. =0 V.

Stepwise increase / decrease analog signal.

AOut 1: 10V = 63575



Calibrate full signal, e.g. 10 V.

Stepwise increase / decrease analog signal.

**Note:** The calibrated values are overwritten when the type of the output signal is changed.

AOut 2:	None	Continue with next analog output.
---------	------	-----------------------------------

## 6.4 Configure Analog Inputs

Config.	Analog in
---------	-----------

AIn 1:	MAI		Select analog input:
--------	-----	--	----------------------

- MAI External analog input module
- ADI Internal analog input module
- None Not applicable

### 6.4.1 MAI Chosen

1.MAI:	SIM1		Select pertaining internal serial interface:
--------	------	--	----------------------------------------------

- SIM1–SIMx

1.MAI:	Address 0		Select pertaining internal address:
--------	-----------	--	-------------------------------------

- Address 0–Address 7 equivalent MAI Address 16–Address 23

1.MAI:	Module X1		Select external MAI module:
--------	-----------	--	-----------------------------

- Module X1–module X4

1.MAI:	0-10V		Select input signal:
--------	-------	--	----------------------

- 0–10 V, 2–10 V, 0–20 mA, 4–20 mA

2.AIn:	None	Continue with next analog input.
--------	------	----------------------------------

### 6.4.2 ADI Chosen

AIn 1: PIM	1		Select pertaining internal digital interface:
------------	---	--	-----------------------------------------------

- PIM1–PIMx

AIn 1: Mode	0-10V		Select input signal:
-------------	-------	--	----------------------

- 0–10 V, 2–10 V, 0–20 mA or 4–20 mA

AIn 2:	None	Continue with next analog input.
--------	------	----------------------------------

## 6.5 Configure Fieldbus Module

Config.	Fieldbus	Configure Fieldbus
Fieldbus: Profibus DP		<input type="radio"/> <input checked="" type="radio"/> Select Fieldbus connection: <ul style="list-style-type: none"> <li>• Profibus DP Internal Profibus module PBU</li> <li>• Modbus TCP Via Ethernet</li> <li>• PROFINET Internal PROFINET module PNU</li> <li>• ETHERNET-IP Internal ETHERNET-IP module</li> <li>• Off Not applicable</li> </ul>
'Profibus DP' chosen:		
Address:	999	Enter slave address

### Modbus services supported:

Function Code	Instruction	Comment
01	Read multiple coils Read digital inputs	Discrete bits are read from a specified bit address. The number of bits is variable.
02	Read multiple input	Discrete bits are read from a specified input address. The number of bits is variable.
03	Read multiple holding registers	Single or multiple data words are read from a specified data word address. The number of data words is variable.
04	Read multiple input registers	Single or multiple data words are read from a specified data word address. The number of data words is variable.
05	Write single coil Set digital output	A single bit is set or reset.
06	Write single holding register	A single data word is written.
15	Write multiple coils Set digital outputs	Several bits are written from a specified bit address. The number of bits is variable.
16	Write multiple holding registers	Several data words are written from a specified data word address. The number of data words is variable.

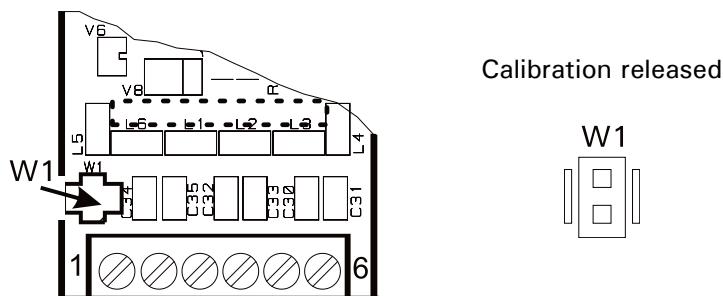
## 7 Calibration Mode

Described below is only the access to the calibration mode, for a detailed description of the calibration procedure refer to the following manuals:

- ADM / DUAL-ADM / ADM8000-Exi Calibration Manual, order No.: ST.2309.0688
- Flintec / HBM Calibration Manual, order No.: ST.2309.1568
- MultiRange Calibration Manual, order No.: ST.2309.0057
- IS-Platforms Calibration Manual, order No.: ST.2309.0113
- DigiTOL-Box Installation Instructions, order No.: ST.2309.1173

Described below is only the access to the calibration mode.

Prior to power up the jumper W1 must be removed. Only with this jumper setting can the changed parameters be saved in memory after the calibration



In Service Mode call up group 'Calibration'.

Calibrate Scale 1		Choose any of the installed scales

If jumper W1 is still in place:

Calibration Locked	Warning: jumper not in calibration position, parameters cannot be saved!
	Enter calibration mode without saving (e.g. to check settings)

**Note:** Left to the display with the calibration steps, the number of the selected scale is shown [W1], [W2], etc.

After pressing the -key to exit the calibration mode:

Save Parameters ? Y	Save parameters in EEPROM
---------------------	---------------------------

- 1 Y(es): Save parameters  
0 N(o): Ignore all changes, do not save data

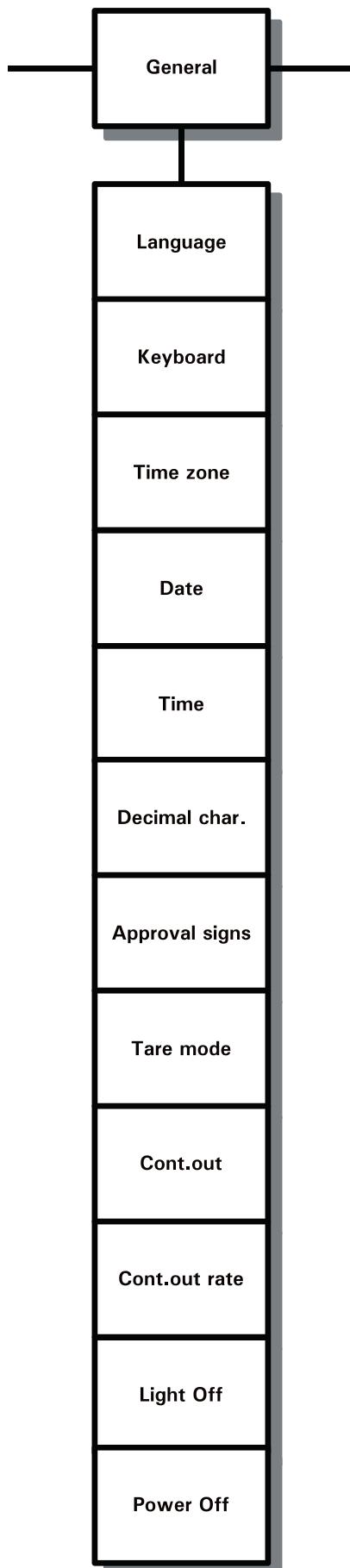
or scrolling

If jumper W1 on ADM module is still in place:

Error Calibr. Jumper	Error message: jumper not in calibration position, parameters cannot be saved!
	Exit calibration without saving

## 8 Entry Of Parameters (General)

Choose group 'General' from Service Mode menu.



Language : German



Select language:

- German
- English

Others depending on application program.

All languages except German:

Keyboard : US



USB keyboard layout:

- US: US layout
- GB: British layout

Time Zone : CET



Select time zone:

- CET Central European Time
- Other time zones:  
Canada, EET, EST, Etc, Europe, GB, GMT, HST, MET, MST, Mideast, NZ, Pacific, Singapore, UCT, US, UTC, WET, Africa, America, Asia, Atlantic, Australia, Brazil
- With 'Etc' a time difference to GMT can be chosen.  
Automatic summer / winter time switching is made in accordance with the chosen time zone.

Time Zone : Dublin



For some entries the particular location must be specified, e.g. 'Dublin'.

**! ATTENTION**

- After changing the time zone, current time must be entered under menu item 'Settings' (see operation manual of application software).

Date : DD.MM.YY



Select format of date:

DD.MM.YY	MM.DD.YY	YY.MM.DD
DD-MM-YY	MM-DD-YY	YY-MM-DD
DD/MM/YY	MM/DD/YY	YY/MM/DD
DD.MM.YYYY	MM.DD.YYYY	YYYY.MM.DD
DD-MM-YYYY	MM-DD-YYYY	YYYY-MM-DD
DD/MM/YYYY	MM/DD/YYYY	YYYY/MM/DD

Time : HH:MM



Select format of time:

- HH:MM
- HH:MM:SS

H=hour      M=minute      S=second

Country Code : XX

Country code of country of installation (required for compliance with locally applicable W&M regulations).

2-character code following ISO-3166-2, e.g.:

- DE Germany
- GB Great Britain
- CA Canada
- NL Netherlands

**Note:** Parameter protected with jumper.

Decimal char.: Dot 

Select character to separate decimals:

- Dot (e.g. 0.00)
- Comma (e.g. 0,00)

**Note:** Parameter protected with jumper.

Approval signs: N 

Select approval signs:

- Y: Weights are printed with approval signs in compliance with former PTB regulations:  
Example: Gross/Tare/Net  
<25,45kg> / <10,00kg> / <15,45kg>  
or  
<25,45kg> / 10,00kgPT / 15,45kgC
- N: Weights are printed in compliance with EC regulations:  
Example: Gross/Tare/Net  
25,45kg / 10,00kgT / 15,45kgN  
or  
25,45kg / 10,00kgPT / 15,45kgN

**Note:** Parameter protected with jumper.

Tare mode: Gross/Net 

Select tare mode:

- Gross/Net  
press tare key to toggle gross / net display and back;
- Auto Clear  
on return to the zero range the tare weight is automatically cleared;
- Net = 0  
every time the tare key is pressed the scale is autotared, on return to the zero range the tare weight is automatically cleared and the display returns to gross mode.

Cont.out: Off 

Setting for continuous output:

- SysTec SysTec format
- Flintec Flintec format
- Customized Freely defined format
- Sys.Remote IT1 Remote Display
- Toledo TOLEDO® format
- Schauf Schauf format
- CAS CAS format
- GS Gebhardt&Schaefer protocol with support of traffic light function
- SPEC1 Customized format
- MT-SICS MT-SICS protocol
- SPEC2 Customized format
- Off Continuous output disabled

Data strings of the continuous output are described in chapter 'Continuous Output'.

Continuous output enabled:

Cont.out: SIM1 

Choose serial interface for continuous output:

- Eth, SIM1–SIMx

**Eth chosen:****Cont.out port:** 99999

TCP/IP port for the external connection. Default: 1900

**Cont.out rate:** 99

Entry of number of updates per second for the continuous output.

**Customized format chosen:****:AAAAAAAAAA**

String for freely defined format, see chapter 'Continuous Output'.

**Light Off (Min.)** 99

If terminal is not in use, the backlighting is switched off after this time has elapsed (powersave for battery operated terminals). Press any key to switch backlighting on again. Enter 0 to disable this function.

**Power Off (Min.)** 99

Enter time in minutes after which the terminal is switched off when it is not in use (powersave function for battery operated terminals).

**Serial No** 9999999999

Entry of 10-digit serial No. of device.

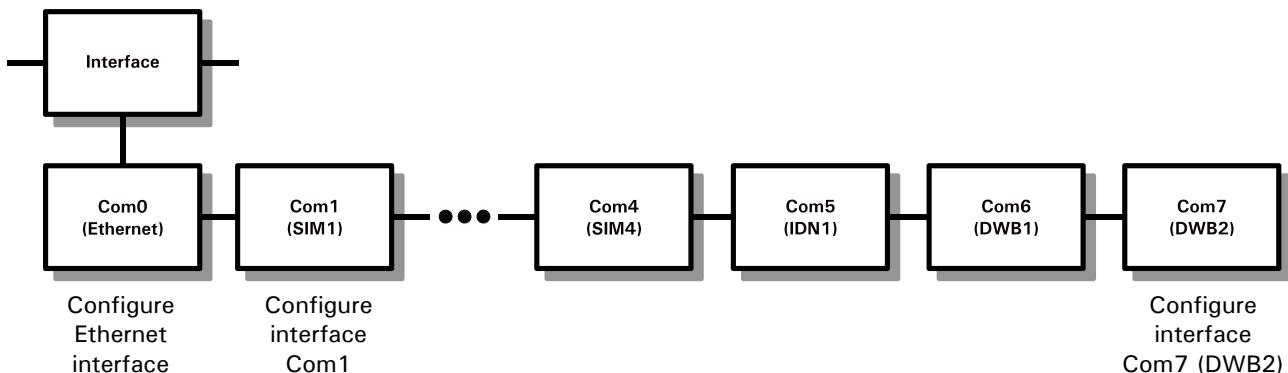
Must be identical to number printed on nameplate.

Required for Ethernet data transmission and approvals.

**Note:** Parameter protected with jumper.

## 9 Interface Configuration

Choose group 'Interface' from Service Mode menu.



**Note:** The setting of parameters must correspond to those of the connected peripheral devices.

### 9.1 Configuration of Ethernet interface

Interface Com0 (Eth)



Com0: Port 99999

Enter port

Com0: Protocol None



Select protocol of Com0:

- None Raw data only
- TTY Printer protocol (data only)
- AckNak ACK / NAK procedure with confirmation
- NoAck NO-ACK procedure without confirmation

If TTY was selected as printer protocol:

Com0: Codepage None



Select character set of output:

- None ISO8859 in accordance with chosen language
- 850 DOS Codepage 'Western Europe' (obsolete printers)
- 852 DOS Codepage 'Central Europe'
- 866 DOS Codepage 'Russia'
- Star DOS Codepage Star printers

Tab ESC/P



Select mode of horizontal alignment for the print fields:

- ESC/P Horizontal alignment with tab function according to ESC/P® protocol
- Spaces Horizontal alignment by insertion of spaces

If AckNak or NoAck was selected as protocol:

Com0: Start Char 999

Entry of start character as decimal value  
(e.g. 2 = STX)

For entry '0' no start character is transmitted.

Com0:End Char 999	Entry of end character as decimal value (e.g. 3 = ETX) For entry '0' no end character is transmitted.
Com0: Checksum None	  Select method to calculate the checksum which is transmitted behind the end character: <ul style="list-style-type: none"> <li>• None No Checksum</li> <li>• XOR Exclusive-Or checksum</li> <li>• CPL Complement of two</li> </ul>
<b>If a start or end character was specified and a checksum was selected:</b>	
Com0:With Start N	 The start character is included in the checksum calculation
Com0:With End N	 The end character is included in the checksum calculation

## 9.2 Configuration of serial interfaces

Interface Com1 (SIM1)	  Continue with interface Com1
Com1: 9600 Baud	  Select baud rate of Com1: <ul style="list-style-type: none"> <li>• 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200</li> </ul>
Com1: 8 Databits	  Select data format for serial interface Com1: <ul style="list-style-type: none"> <li>• 7 data bits, 8 data bits.</li> </ul> <p>Always 1 stop bit is transmitted.</p>
Com1: No Parity	  Select parity for interface Com1: <ul style="list-style-type: none"> <li>• None</li> <li>• Even</li> <li>• Odd</li> </ul>
Com1: No Control	  Select hardware handshake for interface Com1: <ul style="list-style-type: none"> <li>• XOn/XOff</li> <li>• RTS/CTS</li> <li>• None no transmission control</li> </ul> <p><b>Note:</b> RTS/CTS not possible on Com2!</p>
Com1: No Protocol	  Select protocol of Com1: <ul style="list-style-type: none"> <li>• None Raw data only</li> <li>  TTY Printer protocol (data only)</li> <li>• AckNak ACK / NAK procedure with confirmation</li> <li>• NoAck NO-ACK procedure without confirmation</li> </ul>

**If TTY was selected as printer protocol:**

Com1: Codepage None



Select character set of output:

- None ISO8859 in accordance with chosen language
- 850 DOS Codepage 'Western Europe' (obsolete printers)
- 852 DOS Codepage 'Central Europe'
- 866 DOS Codepage 'Russia'
- Star DOS Codepage Star printers

Tab

ESC/P



Select mode of horizontal alignment for the print fields:

- ESC/P Horizontal alignment with tab function according to ESC/P® protocol
- Spaces Horizontal alignment by insertion of spaces

**If AckNak or NoAck was selected as protocol:**

Com1: Start Char 999

Entry of start character as decimal value  
(e.g. 2 = STX)

For entry '0' no start character is transmitted.

Com1: End Char 999

Entry of end character as decimal value  
(e.g. 3 = ETX)

For entry '0' no end character is transmitted.

Com1: Checksum None



Select method to calculate the checksum which is transmitted behind the end character:

- None No Checksum
- XOR Exclusive-Or checksum
- CPL Complement of two

**If a start or end character was specified and a checksum was selected:**

Com1: With Start N

Y

The start character is included in the checksum calculation

Com1: With End N

Y

The end character is included in the checksum calculation

Interface Com2 (SIM2)



Continue with following interfaces.

## 9.3 Configuration for PC ReadIT

### 9.3.1 Using Ethernet

Interface Com0 (Eth) 

Com0: Port 1234 Enter port 1234

Com0:Protocol AckNak   Select protocol of Com0:  
• AckNak ACK / NAK procedure with confirmation

Com0: Start char. 2 Entry of start character as decimal value (2 = STX)

Com0: End char. 3 Entry of end character as decimal value (3 = ETX)

Com0: Checksum XOR   Select method to calculate the checksum which is transmitted behind the end character:  
• XOR Exclusive-Or checksum

Com0: With start N **N** The start character is not included in the checksum calculation

Com0: With end Y **Y** The end character is included in the checksum calculation

### 9.3.2 Serial

Interface Com1 (SIM1) 

Com1: Baud 9600 

Select baud rate of Com1:

- 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200

Suitable for host

Com1: Databits 8 

Select data format for serial interface Com1:

- 7 data bits, 8 data bits.

Always 1 stop bit is transmitted.

Suitable for host

Com1: Parity None 

Select parity for interface Com1:

- None
- Even
- Odd

Suitable for host

Com1: Ctrl. None 

Select hardware handshake for interface Com1:

- XOn/XOff
- RTS/CTS
- None no transmission control

**Note:** RTS/CTS not possible on Com2!

Suitable for host

Com1: Protcl. AckNak 

Select protocol of Com1:

- AckNak ACK / NAK procedure with confirmation

Com1: Start char. 2

Entry of start character as decimal value (2 = STX)

Com1: End char. 3

Entry of end character as decimal value (3 = ETX)

Com1: Checksum XOR 

Select method to calculate the checksum which is transmitted behind the end character:

- XOR Exclusive-Or checksum

Com1: With start N

N

The start character is not included in the checksum calculation

Com1: With end Y

Y

The end character is included in the checksum calculation

## 10 Network

Choose group 'Network' from Service Mode menu.

**Note:** This menu is only available when network connection has been established.

Network settings for Ethernet interface of weighing terminal:

IP	10.0.10.9	Entry of the first IP address for the local net: <b>Note:</b> The weighing terminal does not support DHCP and requires a permanent IP address.
		Entry of a second IP address
Mask	255.255.0.0	Entry of subnet mask of the first IP address
<b>Entry of a second IP address:</b>		
2.IP	192.168.178.13	Entry of a second IP address for another local network that is independent of the first. (E.g. for network participants belonging only to this installation.)
2.Mask	255.255.0.0	Entry of subnet mask of the second IP address
Gate	0.0.0.0	Entry of gateway
DNS:	10.0.1.3	Entry of DNS server
NTP:	192.53.103.108	Entry of NTP server for time synchronization, this requires entry of time zone. Applicable only if time zones are supported by the firmware.
Example for ptbtime1.ptb.de		
FTP pwd:	9999999	Entry of password for FTP access to the shared directory. <ul style="list-style-type: none"> <li>• Shared directory: User 'shared'</li> <li>• USB device: User 'usbshared'</li> </ul>
Web Access	Off	Enable / disable access to data via web browser.
For a description of SysTec Web Interface refer to:		
• Web Interface Operation Manual, order No.: ST.2309.1692		
<b>Web Access = On</b>		
Web pwd:	9999999	Specify administrator password
Access No.	999	Max. number of users who may be logged in at the same time.
Web-App login	Y	Allows access via a web application.
Update SSL cert	No	Yes: Creation of a certificate and storage in the FTP folder.

**Start auto ping** Y

Start sending ICMP packages to the gateway.

**Note:** In some networks ARP broadcast may be disabled which can lead to problems with the communication between WLAN controller and the module. In this case, sending an ICMP package to the network gateway at regular intervals can rectify the problem. The effect is that the IP address and the hardware address are entered in the controller. Since the controller discards this information after a few minutes, it is required to send the package at regular intervals. When 'Auto Ping' is enabled, an ICMP package is sent every 60 seconds.

**Terminal No.:** 999

Entry of terminal No. for the network name.

The network name is generated from the terminal type and the terminal No.

Example: IT8000ET\_001, IT8000ET\_123

**Rem. Display Token** Y



Y: Entry of a Remote Display Token for PC *ScaleView*.



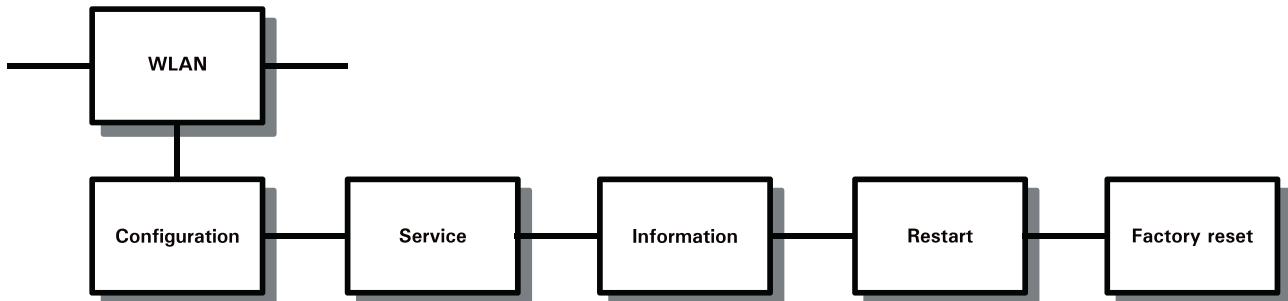
Confirm

For a detailed description refer to:

- PC *ScaleView* Operation Manual, order No. ST.2309.1817

## 11 WLAN

Choose Service Mode group 'WLAN'.



For a description of WLAN settings refer to:

- WLX Installation Instructions, order No. ST.2309.1590

## 12 Licenses

Choose group 'Licenses' from Service Mode menu.

A license key is needed to connect a terminal with a PC or mobile device via PC *ScaleView*.

PC ScaleView 1X inv

Display: License for the connection of 1 device not activated

PC ScaleView 1X inv



Select type of license:

- 1X: Allows the connection of 1 device
- 2X: Allows the connection of 2 devices



Code: 99-99999-99999-

Enter license code



Code is ok

Message: License key is valid

PC ScaleView 1X val

Display: License for the connection of 1 device activated

License key invalid

Invalid Code

For a detailed description refer to:

- PC *ScaleView* Operation Manual, order No. ST.2309.1817

## 13 Backup

Choose group 'Backup' from Service Mode menu.

This menu provides functions to save and restore data of the weighing terminal using a USB memory stick.

Insert the formatted USB stick into the USB socket. The USB stick has to be formatted in FAT32.

Backup:	Backup		<ul style="list-style-type: none"> <li>• Backup: Save data</li> <li>• Restore: Restore data</li> </ul>

### 13.1 Backup data

Backup:	Backup		
Name:	9-99-99_99-99		Display of backup file name consisting of date and time of backup.

Performing backup and system rebooting. The weighing terminal starts with basic step.

### 13.2 Restore data

Backup:	Restore		
Backup	9999-99-99_99		Display of the first backup file.
Backup	9999-99-99_99		Select backup file.

Performing restore and system rebooting. The weighing terminal starts with basic step.

Error USB stick	
No USB stick.	No USB stick present or stick not formatted correctly.

## 14 Test

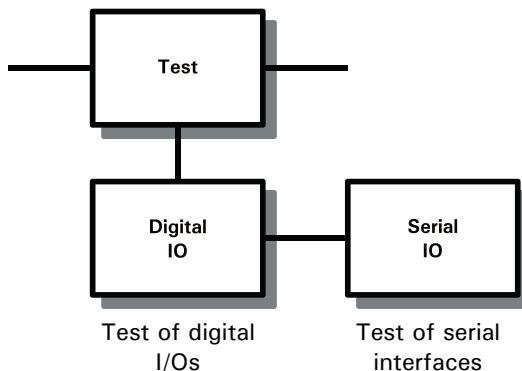


### W A R N I N G

Exercise utmost care when making checks, tests and adjustments that can actuate movable parts such as feeding devices, gates, flaps, conveyors, etc. Make absolutely sure that nobody is within reach of movable parts.

Failure to observe this precaution could result in bodily injury!

Choose group 'Test' from Service Mode menu.



### 14.1 Test Of Digital Inputs/Outputs

Test:      Digital IO



G1: 00000010 00000001

Status information 0 or 1 for the first I/O group.  
Inputs are shown on the left, outputs on the right hand side. (1 = input/output 'on').

The keys 0–7 are used to toggle the outputs 0 to 7.

The picture above shows the state:

input 0, 2–7	= Off	input 1	= On
output 0	= On	output 1–7	= Off

G2 2



Continue with next I/O group (if applicable).

## 14.2 Test Of Serial Interfaces

Test: Digital IO 

Test: Serial IO 

Com1: not ok

Test of serial interfaces (RS232 and RS485-4-wire);  
RS232: jump lead from terminal 1 to 3 and from  
terminal 2 to 4 (connect RTS with CTS and TxD with  
RxD).

RS485.4: jump lead from terminal 1 to 3 and from  
terminal 2 to 4 (connect TxD+ with RxD+ and TxD-  
with RxD-).

**Note:** Test of RS485 2-wire and 20 mA interfaces is  
not possible.

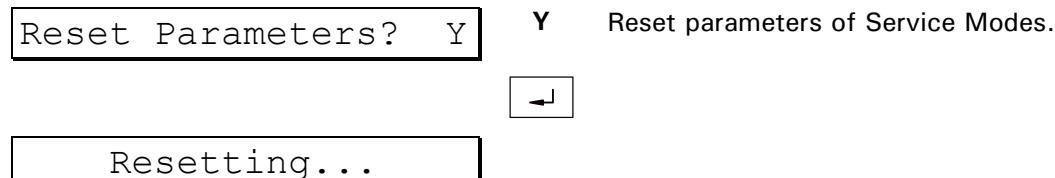
Com2: not ok  Continue with next interface.

## 15 Reset

With this function values and parameters of the Service Mode can be reset to factory settings. Parameters for calibration and network configuration remain unchanged.

Choose group 'Reset' from Service Mode menu.

### 15.1 Reset Parameters



Group	Setting	Setting
Interface	Com0: Port 1234	Com1: Ctrl. None
	Com0: Protocol None	Com1: Protocl. None
	Com1: Baud 9600	Com1: Start char. 0
	Com1: Databits 8	Com1: End char. 0
	Com1: Parity None	Com1: Checksum None
General	Language: German	Tare mode: Gross/Net
	Date: DD.MM.YY	Cont.out Off
	Time: HH:MM	Light Off (Min.) 0
	Decimal char.: Dot	Power Off (Min.) 0
	Approval signs: N	
Config. Scale	Scale 1: ADM	Scale 2: None
Config. Digital IO	Group 1: PIM	Group 2: None
Config. Analog out	AOut 1: None	
Config. Analog in	AIn 1: None	
Configuration Fieldbus	Fieldbus: Off	

## 15.2 Reset Approved Weight

**ATTENTION**

- All records in the W&M approved data archive are irrevocably deleted without further prompt for confirmation.

Reset Approved Wgt	Y	Delete W&M approved data archive
<input type="button" value="→"/>		
Storage	Intern	<input checked="" type="radio"/> <input type="radio"/> Choose storage type:
		<ul style="list-style-type: none"><li>Intern Internal storage</li><li>Extended USB memory stick 19OPT601, connected on CPU board.</li></ul>
<input type="button" value="→"/>		
Type	Date+Id	<input checked="" type="radio"/> <input type="radio"/> Create W&M approved data archive
		<ul style="list-style-type: none"><li>Date + Id With Date and Ident number (4 digits)</li><li>Cons.Id With consecutive number (6 digits)</li></ul>
<input type="button" value="→"/>		
Reset now ?	Y	<input checked="" type="radio"/> <input type="radio"/> • Y Reset • N Cancel
<input type="button" value="Resetting ..."/>		
Service: Reset		

## 16 Data Archive

A record – secured with checksum – is stored for every completed weighing transaction in the internal data archive, consisting of weight, date and consecutive Id-No. The Id-No. is reset to 0001 with every change of the date. As an alternative to the internal memory, also a USB stick may be used as data storage device. The stored data are read-only and cannot be deleted or changed.



Call up data archive with display switching key.

<b>Previous / Next</b>	Scroll records
<b>Search date</b>	Enter date of record that is to be looked up
<b>Id-No.</b>	Enter ident No. of record that is to be logged up
<b>Gross</b>	Gross weight of record
<b>Net</b>	Net weight of record
<b>Tare</b>	Tare weight of record

If an error is detected in the checksum of the data archive, the stored data are void! Instead of a weight, a corresponding error message is shown.

## 17 Continuous Output (Cont.out)

The interfaces Ethernet (COM0), COM1–COMx can be configured as continuous output, one of several protocols can be chosen in group 'General' of the Service Mode.

Setting of interface parameters is made in group 'Interface' of the Service Mode.

### 17.1 SysTec Standard Protocol

The data string consists of 15 ASCII characters plus CR and LF. It includes a status for motion / no motion, the net weight and the unit sign. Characters not used are filled with space characters.

Example:

'12345678901234567'	Characters:
	1. char.: Start character always S
's 10.98 t c <sub>R</sub> L <sub>F</sub> '	2. char.: Status      ⊂ (space) = scale settled
'SD 10980 kg c <sub>R</sub> L <sub>F</sub> '	D = scale in motion
	3.–12. char. weight 10 characters, in the format of the scale calibration
	13. char.      always ⊂ (space)
	14.–15. char. weight unit
	16.–17. char. CR and LF

### 17.2 SysTec Remote Protocol

This data string is used to connect an IT1 remote display with extended functions.

The operating mode 'Remote Display' must be chosen in the configuration of the IT1 remote display. Actuating the tare and zero key at the remote display is transmitted back to the weighing terminal and has the same effect as pressing the corresponding key here.

'123456789012345'	Characters:
' 100.0 kg N c <sub>R</sub> L <sub>F</sub> '	1. char.: Status      ~ = scale in motion ° = scale settled 1, 2, 3 = weighing range
	2.–9. char. weight 8 characters, in the format of the scale calibration
	10. char.      always ⊂ (space)
	11.–12. char. weight unit
	13. char.      N = net weight ⊂ (space) = gross weight
	14.–15. char. CR and LF

### 17.3 Customized Protocol

The data string can be freely defined. In the table below **x** and **y** are wild cards. If the condition is true, the character specified under **x** is transmitted. If the condition is false, the character specified under **y** is transmitted instead.

If you want – for instance – to send the character **~** when the scale is in motion, the corresponding string is **M~:R** (condition = true). If the condition is false, character R is sent instead.

The entry of a colon followed by a character **y** is optional. In this case, a space character is transmitted if condition = false.

Weights are transmitted as shown on the display including decimal separator.

Non-significant (leading) weight digits are transmitted as space.

String	Transmission	Example
<b>Mx:y</b>	Transmits the character specified under <b>x</b> , when the scale is <b>in motion</b> , e.g.: <b>~</b> , else transmits the character specified under <b>y</b>	<b>M~:R</b>
<b>mx:y</b>	Transmits the character specified under <b>x</b> , when the scale is <b>settled</b> , e.g.: <b>R</b> , else transmits the character specified under <b>y</b>	<b>mR:~</b>
<b>Ox:y</b>	Transmits the character specified under <b>x</b> , when the scale is <b>in overload</b> , e.g.: <b>U</b> , else transmits the character specified under <b>y</b>	<b>OU:N</b>
<b>ox:y</b>	Transmits the character specified under <b>x</b> , when the scale is <b>not in overload</b> , e.g.: <b>N</b> , else transmits the character specified under <b>y</b>	<b>oN:U</b>
<b>Zx:y</b>	Transmits the character specified under <b>x</b> , when the scale is <b>in zero range</b> , e.g.: <b>N</b> , else transmits the character specified under <b>y</b>	<b>ZN:A</b>
<b>zx:y</b>	Transmits the character specified under <b>x</b> , when the scale is <b>not in zero range</b> , e.g.: <b>A</b> , else transmits the character specified under <b>y</b>	<b>zA:N</b>
<b>Px:y</b>	Transmits the character specified under <b>x</b> , when the scale is <b>tared</b> , e.g.: <b>T</b> , else transmits the character specified under <b>y</b>	<b>PT:N</b>
<b>px:y</b>	Transmits the character specified under <b>x</b> , when the scale is <b>not tared</b> , e.g.: <b>N</b> , else transmits the character specified under <b>y</b>	<b>pN:T</b>
<b>[space]</b>	Transmits a space character	<b>[space]</b>
<b>Gx</b>	Transmits the <b>gross weight</b> with <b>x</b> digits, e.g.: <b>8</b>	<b>G8</b>
<b>Nx</b>	Transmits the <b>net weight</b> with <b>x</b> digits, e.g.: <b>8</b>	<b>N8</b>
<b>Tx</b>	Transmits the <b>tare weight</b> with <b>x</b> digits, e.g.: <b>6</b>	<b>T6</b>
<b>Cx</b>	Transmits the <b>number of pieces</b> with <b>x</b> digits, e.g.: <b>6</b> . When the next letter is <b>U</b> , either the <b>net weight</b> or <b>number of pieces</b> will be transmitted.	<b>C6</b>
<b>U</b>	Transmits the <b>unit of calibration</b> , e.g.: <b>'kg'</b> , <b>'t'</b> , <b>'g '</b> , <b>'lb'</b>	<b>U</b>
<b>R</b>	Transmits the <b>weighing range</b> , space for single range scales	<b>R</b>
<b>123</b>	Transmits a <b>specified character</b> (3-digit decimal code)	<b>002=STX</b>
<b>S</b>	Special character from application, for example traffic light control ('TRUCK' only).	<b>S</b>

**Example for a data string to control a remote display with motion / no-motion and gross / net indication.**

083	MM:S	PN:G	N8	U	013	010
					LF	
				CR		
			Unit			
			Net weight, 8 characters			
			When scale is tared 'N' (net), otherwise 'G' (gross)			
			When scale in motion 'M' (motion), otherwise 'S' (stable)			
			Fixed 'S'			

## Extended Standard Protocol

The data string with the option to transmit status information consists of 18 ASCII characters plus CR and LF. It includes information on weighing range, gross/net, no-motion/motion, scale in zero as well as the weight and the unit sign. Characters not used are replaced with space characters.

Example string: '088087RPN:GMM:SZZ N9 U013010'

Char.: '123456789012345678901'

- 1   |\_\_\_\_\_ Fixed 'X' (ASCII code 088) as start character
- 2   |\_\_\_\_\_ Fixed character 'W' (ASCII code 087) as marker for 'weight data string' or 'D' for 'general data' (reserved for future extension)
- 3   |\_\_\_\_\_ Weighing range '1', '2' etc. or space for single-range scale
- 4   |\_\_\_\_\_ 'N' for net weight, 'G' for gross weight
- 5   |\_\_\_\_\_ 'M' for scale in motion or 'S' for scale settled
- 6   |\_\_\_\_\_ 'Z' when scale in zero range, otherwise space character
- 7   |\_\_\_\_\_ 'S' for traffic light function
- 8   |\_\_\_\_\_ | Weight, 9 characters, right justified, with preceding minus sign and decimal separator, if applicable
- 17           |\_\_\_\_\_ Fixed space character between weight and unit
- 18          |\_| Weight unit 'kg', 'g', 't' or 'lb' (others if applicable), 2 characters, left justified
- 20          |\_| <CR> (carriage return)
- 21          |\_| <LF> (line feed)

Examples:

Char.: '123456789012345678901'

- 'XW NS       1371,5 kg<sup>C<sub>R,L</sub>F</sup>' Net weight, scale settled,
- 'XW GSZ       0,0 kg<sup>C<sub>R,L</sub>F</sup>' Gross weight, scale in zero and settled,
- 'XW2GS       21380 t<sup>C<sub>R,L</sub>F</sup>' Gross weight, scale in second weighing range and settled,
- 'XW NM       -1,35 kg<sup>C<sub>R,L</sub>F</sup>' Net weight, scale in motion and weight negative.

## 17.4 CAS Protocol

The data string to transmit the weight consists of the 4-character status word, 6 ASCII characters for the weight, 1 separator, the 2-character unit sign plus CR and LF. Example:

'123456789012345678901'	Characters:	
'ST,NT,X,- 10.95 kg <sup>c</sup> <sub>R</sub> F'	1. char.: Status	ST = scale stable US = scale in motion OL = overload
	3. char.	separator (comma)
	4.-5. char.	NT = net
	6. char.	separator (comma)
	7. char.: Status bits	'76543210' (Bit) '11000110'
	Bit 7	always 1
	Bit 6	0 = scale in motion 1 = scale stable (settled)
	Bit 5-3	always 0
	Bit 2	0 = scale tared 1 = scale not tared
	Bit 1	0 = net weight 1 = gross weight
	Bit 0	always 0
	8. char.	separator (comma)
	9. char.	- = weight negative = (space) = weight positive
	10.-16. char.	weight 7 characters, in format of scale calibration
	17. char.	separator = = (space)
	18.-19. char.	weight unit
	20.-21. char.	CR and LF

## 17.5 Flintec Protocol

The data string to connect a Flintec remote display consists of 1 start character (@), 7 ASCII characters for the net weight plus CR. Example:

'123456789'	Characters:	
'@ 10.98 <sup>c</sup> <sub>R</sub> '	1. char.	always @ (Hex 40)
	9. char.	always CR (Hex D)
non-significant characters are filled with space (Hex 20).		

## 17.6 GS Protocol (Gebhardt & Schäfer With Traffic Light Function)

The data string to control the remote display consists of 15 ASCII characters plus CR and LF. It contains a status character for motion / no-motion, the color of the traffic light, the net weight and the unit sign. Characters not used are filled with space characters. Example:

'12345678901234567'	Characters:	
	1. char.: Start character	always S
'S    0 10.98 t c <sub>RLF</sub> '	2. char.: Status	(space) = scale settled
'SD  0 10980 kg c <sub>RLF</sub> '		D = scale in motion
	3.-5. char.	(space)
	6. char.: Traffic light	0 = off 1 = red 2 = green 3 = red + green
	7.-12. char.	weight, 6 characters, in format of scale calibration
	13. char.	(space)
	14.-15. char.	weight unit
	16.-17. char.	CR and LF

## 17.7 MT-SICS Protocol

The data string to control a remote display consists of 17 ASCII characters plus CR and LF. It contains the motion / no-motion status, the net weight and the unit sign. Characters not used are filled with space characters. Example:

'1234567890123456789'	Characters:	
	1. char.: Start character	always S
	2. char.	(space)
'S S    10.98 t CRLF'	3. char.: Status	S = scale settled
'S D  10980 kg c <sub>RLF</sub> '		D = scale in motion
	4. char.	(space)
	5.-14. char.	weight, 10 characters, in format of scale calibration
	15. char.	(space)
	16.-17. char.	weight unit
	18.-19. char.	CR and LF

## 17.8 Schauf Protocol

The data string to control a Schauf remote display consists of 10 ASCII characters. Example:

'1234567890'	Characters:
'<ESC>!'" 100.0 <sup>c_R</sup> '	1. char. always [ESC] (Hex 1B)
	2. char. always ! character [33] (Hex 21)
	3. char. always " character [34] (Hex 22)
	4.-9. char. weight, 5 characters, in format of scale calibration
	10. char. always CR character [13] (Hex 0D)

## 17.9 SPEC1 Protocol

The data string to control a remote display consists of 22 characters plus CR and LF. It contains net weight, tare weight, unit code and status information. Characters not used are filled with space characters. Example:

'123456789012345678901234'	Characters:
's <sub>x</sub> 123456 100000 XY <sup>c_R_F</sup> '	1. char. always <STX> Hex 02
	2. char. always ↵ (space)
	3.-10. char. net weight, 8 characters, no decimal separator
	11. char. always ↵ (space)
	12.-19. char. tare weight, 8 characters, no decimal separator
	20. char. always ↵ (space)
	21. char.: Status bits '76543210' (bit) '00001001' Bit 7-4 always 0 Bit 3 0 = scale tared 1 = scale not tared Bit 2 0 = scale in zero range 1 = scale not in zero range Bit 1 0 = scale in motion 1 = scale settled Bit 0 always 1
	22. char.: code for weight unit 00000000 – kg 00000001 – g 00000011 – t
	23.-24. char. CR and LF

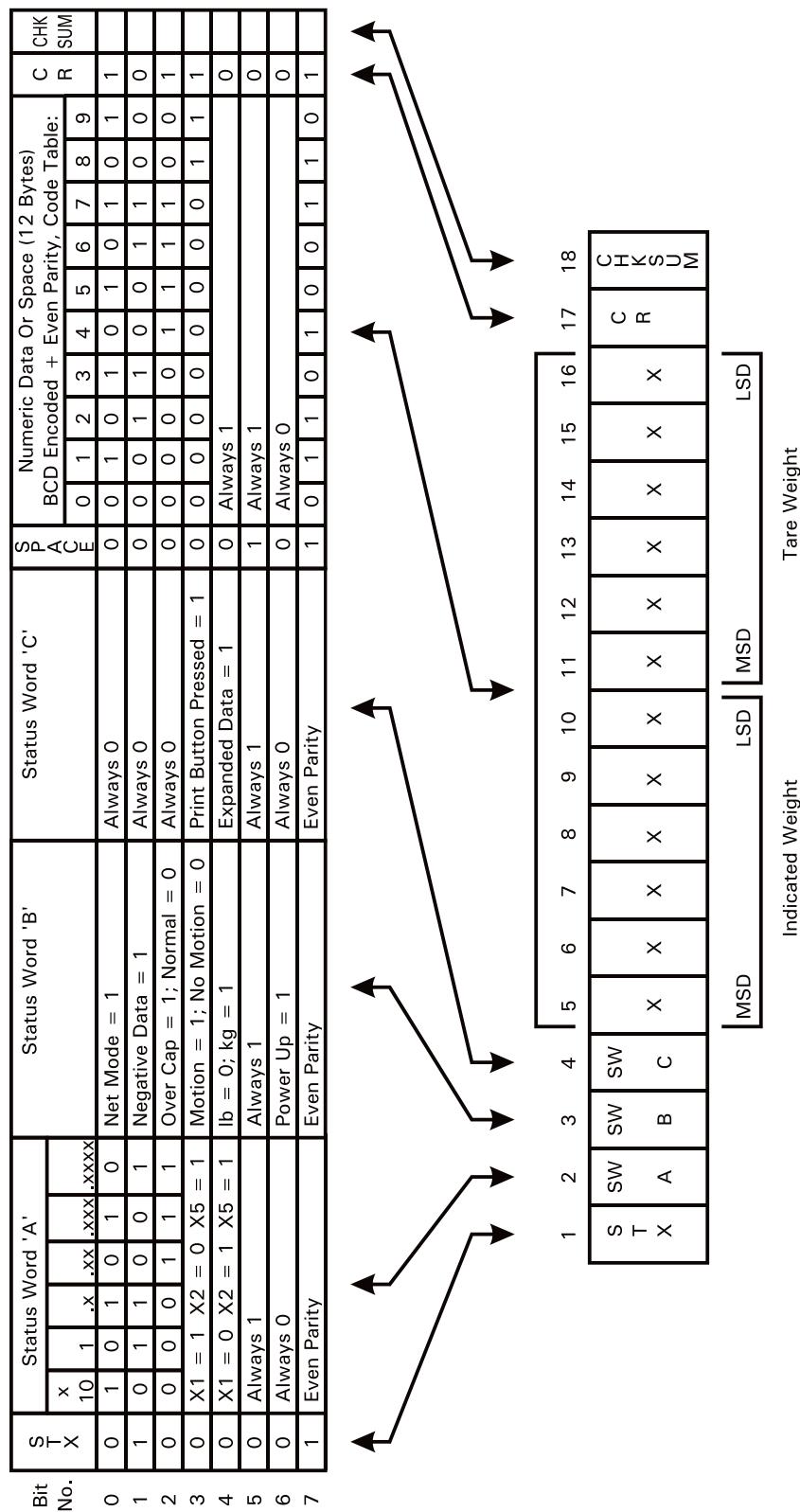
## 17.10 SPEC2 Protocol

The data string for transmission of weight consists of the 2-character status information, 5 ASCII characters for the weight, 1 separator, 2-character unit sign plus CR and LF. Example:

'123456789012345'	Characters:
's_x- 10095KNM <sup>C</sup> <sub>R</sub> <sup>L</sup> <sub>F</sub> '	
1. char.	always <STX> Hex 02
2. char.: Prefix	- = weight negative □ (space) = weight positive
3.-4. char.	always □ (space)
5.-10. char.	weight 5 characters, in format of scale calibration
11. char.: Unit	K = kg L = lb
12. char.: Mode	G = gross weight N = net weight
13. char.: Status	M = scale in motion □ (space) = scale settled
14.-15. char.	CR and LF

## 17.11 TOLEDO® Protocol

The data string emulates the essential functions of the Continuous Mode as it is output by digital indicators of the series TOLEDO® 8132, 8140, 8142, 8520, 8530 etc.



Transmission parameters are: 4800 baud, 7 data bits, even parity, no hardware handshake. Checksum is defined as the 2's complement of the 7 low order bits of the binary sum of the 7 low order bits of all characters preceding the checksum including STX and CR. Bit 8 of the checksum is parity over the 7 low order bits of checksum.

## 18 Transport, Maintenance And Cleaning

### 18.1 Transport

**Notes:**

- Transport and storage of electronic components such as boards, EPROMS, etc. must only be made in suitable anti-static ESD bags or cases.
- Storage temperature -25 to +70 °C at 95 % max. relative humidity without condensation.

### 18.2 Maintenance

**! CAUTION**

- This unit and its associated equipment must be maintained by qualified personnel only, who are familiar with the construction and operation of all equipment in the system and the potential hazards involved. Failure to observe these precautions could result in bodily injury!

Disconnect all power to this unit before servicing!

The weighing terminal is designed to require a minimum of maintenance and service, however, depending on the environmental conditions a visual inspection at regular intervals is recommended. The frequency at which normal maintenance (cleaning and inspection) should be performed, when installed in a clean office environment, should be twice a year. However, if the unit is subject to a dusty or dirty environment the frequency should be increased as required. At these inspections it should be made sure that all connected cables are undamaged and that all connectors are tightly fastened.

Maintenance of scale platforms is required at regular intervals depending on use and environment. The accuracy of scales can be affected by dirt, foreign objects, etc. and appropriate maintenance is strongly recommended. Also recommended is the calibration with certified test weights at regular intervals.

### 18.3 Cleaning

**! CAUTION**

- Disconnect all power to this unit before servicing!

**! CAUTION**

- Concentrated leaches or acids, solvents, pure alcohol, chloric or saline cleaning agents must not be used.

The keyboard overlay is resistant to acetone, trichloro, alcohol, ether, nitric acid (20 %), hexane, sulphuric acid (20 %) and all-purpose cleaners.

Clean the keyboard and covers with a soft clean cloth that has been dampened with a mild window type cleaner. Do **NOT** use any type of industrial solvent or the finish of the unit may be damaged. Do not spray cleaner directly on the unit.

If cleaning agents are used that contain leach, acid or alcohol, pure water must be used to wash off any residue.

## 18.4 Replacing The Battery

**! CAUTION**

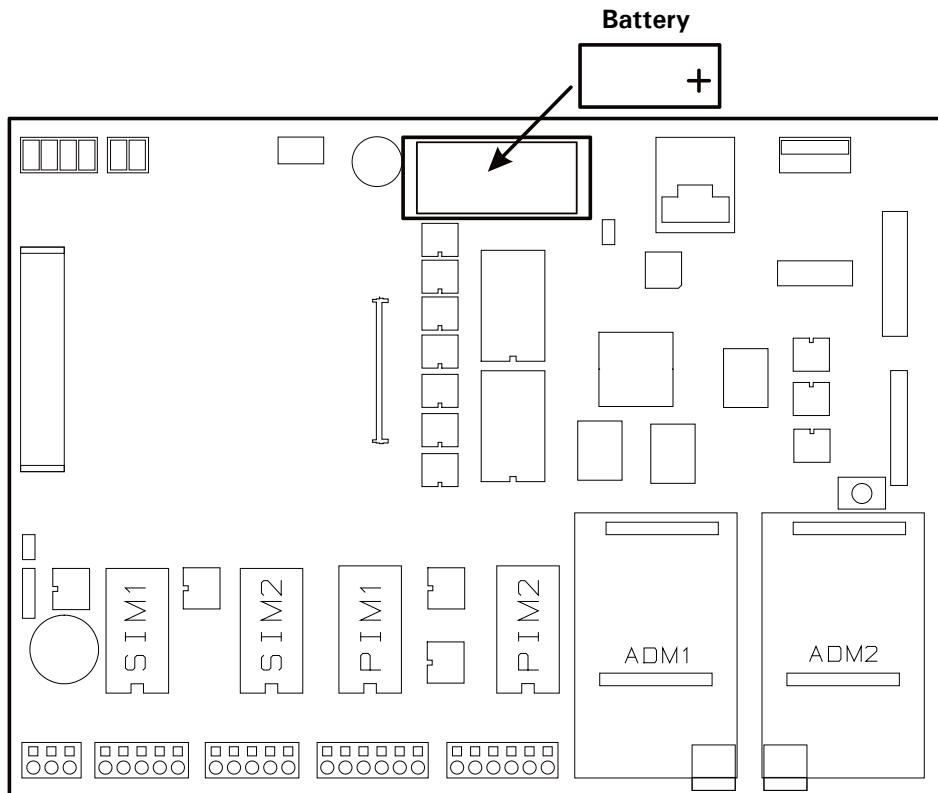
- For the storage of data the weighing terminal contains a lithium battery. Risk of explosion if battery is replaced improperly! Replace only with battery of the same type or with compatible type recommended by manufacturer. Disposal of used batteries only as indicated by manufacturer.

The life time of the lithium battery that backs up RAM and real-time clock is at least three years in normal operation. Thus, the battery needs to be replaced at 3-year intervals by a trained service technician.



**W A R N I N G**

Disconnect all power to the instrument and/or unplug line cord prior to opening the housing!  
Failure to observe this precaution could result in bodily injury!



To replace the battery proceed as follows:

- Disconnect all power to the instrument, unplug line cord.
- Open the housing and refer to picture above to locate the mainboard.
- Use small screw driver or other suitable tool and carefully remove bracket from battery holder.
- Carefully remove old battery from holder and insert new one within 30 sec. **Note:** Observe correct polarity as shown on the picture, otherwise the entered data will not be stored!
- Put bracket of battery holder back in place.
- Close housing and power the instrument up. Display of weighing terminal shows power up message. The unit is operational again.

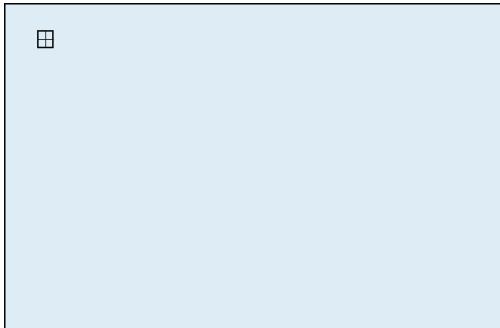
Please note: Observe all applicable regulations for the disposal of used batteries!

## 18.5 Calibration Of Display

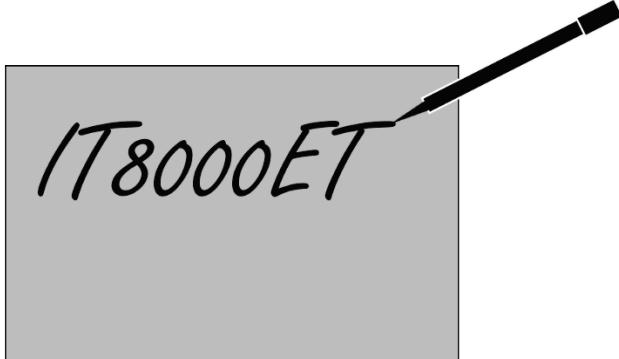
**ATTENTION**

- To calibrate the display use only suitable touch panel pen and press very carefully only. Other sharp or pointed objects may scratch and damage the display.

- The weighing terminal is powered up and running.
- To access calibration press 'On/Off switch' for approx. 20 sec. 
- Ignore the messages 'Power off is disabled' and 'Power off in 5 seconds'.
- When the message 'Screen calibration is started after key release' appears the unit is ready for calibration.
- Release the 'On/Off switch'.
- In the upper left corner of the display a marking grid appears.



- Now use a suitable touch pen and touch the center of the grid at the 5 positions to which it moves over the screen during the calibration.
- The display turns black, calibration is done.
- In the test mode draw with a suitable touch pen on the display. Calibration is correct when the image on the display follows exactly the position of the pen, if not, calibration must be repeated.



- Touch any point on the display twice to terminate test mode.

## 19 Trouble Shooting

**CAUTION**

- This unit does not contain any customer serviceable parts!
- Only permit qualified personnel to service this equipment. Exercise care when making checks, tests, and adjustments!

If any problem arises that has not been explained above, please follow this check list:

- Power supply on and line cord undamaged (visual inspection)?
- All cables connecting to scales and peripheral devices undamaged (visual inspection)?
- Connectors fitted correctly and tightly secured at peripheral devices (visual inspection)?

If operational difficulties are encountered that cannot be rectified by means of this manual, obtain as much information as possible regarding the particular trouble, as this may eliminate a lengthy, detailed checkout procedure.

If possible, try first to determine the conditions under which the problem occurs. Try to find out whether the appearance of the difficulties can be reproduced under the same conditions.

For the systematic analysis of an unknown problem the information as listed below is required:

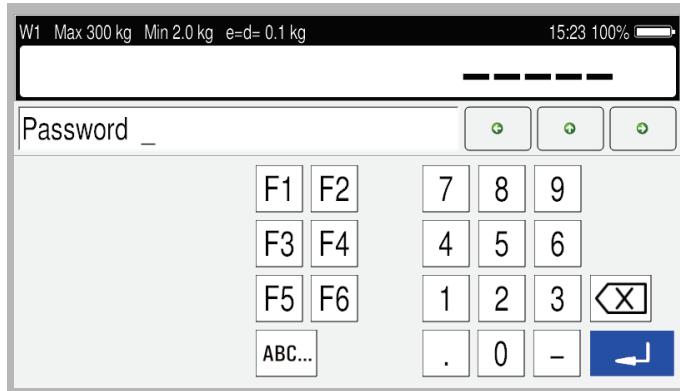
- Serial No. of the unit and its peripheral components
- Program version as displayed on power up
- Exact wording of any error message displayed
- Type and model of peripheral devices related to the problem (e.g. scale, printer, etc.)

To obtain professional assistance contact your service station stating the information listed above.

**CAUTION**

- It is suggested that assistance from trained service personnel be requested in the event a problem should arise that is beyond the scope of this instruction manual.

## 19.1 Error Log Of Scale



**Calibrate Scale 1** **F1** View error log of scale

06.06.12 08:52 Ok **<** **>** Selection

06.06.12 08:52 Ok **F1** Return to 'Calibrate Scale 1'

Date, time and error code of event are shown.

Code	Event
Ok	Ok
Over	Overload
Under	Underload
Range	Out of range
Miss.	Not installed
Incl.	Incline sensor
PUOvr	Powerup out of range
PUUdr	Powerup motion
Invalid	Not calibrated
IOErr	I/O error
Not I	Not installed
NotOk	Not ok
E33	Other error message 33
66	Service Mode active

## 19.2 Error Messages

If an error occurs during calibration or normal operation, error messages are displayed as follows:

Error Message	Possible Cause	Corrective Measure
<b>Calibration Locked</b>	<ul style="list-style-type: none"> <li>Jumper for protection of calibration parameters in position 'protected'</li> </ul>	<ul style="list-style-type: none"> <li>Set calibration jumper to calibration position</li> </ul>
<b>Error Calibr. Jumper</b>	<ul style="list-style-type: none"> <li>Parameters cannot be saved, jumper in wrong position</li> </ul>	<ul style="list-style-type: none"> <li>Set jumper to correct position, repeat calibration</li> </ul>
<b>ADM not installed</b>	<ul style="list-style-type: none"> <li>No A/D converter installed</li> </ul>	<ul style="list-style-type: none"> <li>Check A/D converter</li> </ul>
<b>Not Available</b>	<ul style="list-style-type: none"> <li>No scale selected</li> </ul>	<ul style="list-style-type: none"> <li>Check parameters in Service Mode</li> </ul>
<b>ADM Defect</b>	<ul style="list-style-type: none"> <li>No data received from A/D converter</li> <li>Short circuit in load cell cable</li> </ul>	<ul style="list-style-type: none"> <li>Replace A/D converter</li> <li>Check cabling</li> </ul>
<b>Resolution Error</b>	<ul style="list-style-type: none"> <li>Internal resolution too small, must be at least tenfold the displayed resolution</li> </ul>	<ul style="list-style-type: none"> <li>Select bigger increment size</li> <li>Use load cell with lower capacity</li> </ul>
<b>Out Of Range</b>	<p>A/D converter overrange:</p> <ul style="list-style-type: none"> <li>Wiring error load cell</li> <li>Load cell defective</li> <li>Scale heavily overloaded</li> </ul>	<ul style="list-style-type: none"> <li>Check wiring</li> <li>Check load cell</li> <li>Unload scale</li> </ul>

Error Message	Possible Cause	Corrective Measure
<b>Overload</b>	<ul style="list-style-type: none"> <li>Scale in overload</li> </ul>	<ul style="list-style-type: none"> <li>Unload scale</li> </ul>
-----	<ul style="list-style-type: none"> <li>Setting to zero or taring impossible because of scale in motion</li> <li>CPU does not receive data from weighing interface</li> </ul>	<ul style="list-style-type: none"> <li>Settle scale</li> <li>Check internal and external wiring and cabling</li> </ul>
<b>Powerup Out of Range</b>	<ul style="list-style-type: none"> <li>Error power up zero. This message appears on power up if the weight on the scale exceeds the power up zero range (+2 %, +10 %) or is below the power up zero range as set in the calibration (-2 %, -10 %) as set in the calibration.</li> </ul>	<ul style="list-style-type: none"> <li>Unload scale or apply dead load</li> </ul>
<b>Powerup Motion</b>	<ul style="list-style-type: none"> <li>This message appears on power up if the terminal cannot detect a settled weight within the specified power up zero range (<math>\pm 2\%</math>, <math>\pm 10\%</math>).</li> </ul>	<ul style="list-style-type: none"> <li>Settle scale</li> </ul>
<b>Error Transmission</b>	<ul style="list-style-type: none"> <li>Host switched off or offline, data cable not connected or damaged</li> </ul>	<ul style="list-style-type: none"> <li>Switch on host and start communication program</li> <li>Check cable and connectors</li> <li>If problem cannot be rectified, disable data transmission</li> </ul>

## 20 Technical Data

### 20.1 IT8000ET

<b>Housing</b>	Stainless steel wall/desk housing, protected to IP65, weight approx. 4.2 kg Stainless steel panel-mount housing, fascia plate protected to IP65 (when installed accordingly)
<b>Temperature Range</b>	Storage: -25 °C to +70 °C at 95 % relative humidity max. without condensation Operation: -10 °C to +40 °C at 95 % relative humidity max. without condensation
<b>DC Power Supply</b>	Supply voltage $U_N$ : 12 V (-15 %) – 30 V (+10 %) DC Rated Current $I_N$ : 2.2–0.6 A
<b>Display</b>	Active touch sensitive color TFT, size 152 x 91 mm (7"), 800 x 480 pixel
<b>Processor</b>	32-bit ARM processor, 266 MHz Linux operating system
<b>Scale Interface Module</b>	ADM to connect analog load cells in 4- or 6-wire mode; W&M approved resolution of 6000 divisions 50–400 updates / second Overall impedance of connected load cells: 43–4500 Ω DWB to connect to digital load cells with RS485 interface, IDN to connect to Mettler-Toledo force transducers with IDNet interface.
<b>Battery</b>	Size ½ AA (e.g. Varta 6127); battery backup for data, parameters and files (min. 3 years in normal operation, approx. 1 year when permanently switched off), optional data backup on PC.

#### Options:

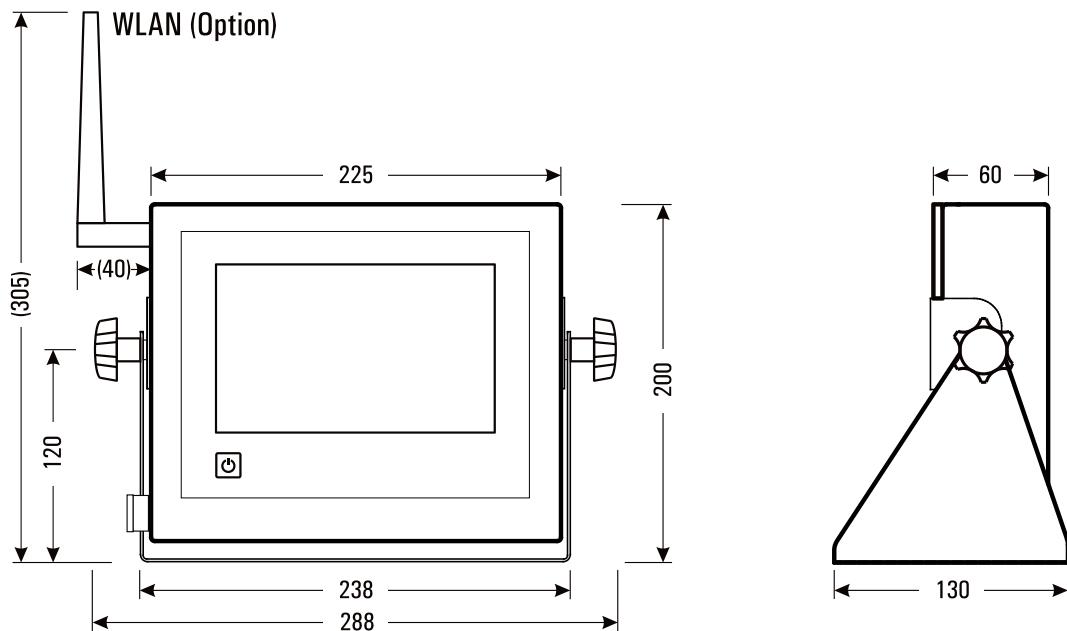
<b>Serial Interface Modules 2 x SIM</b>	SIM-RS232, SIM-RS485-4-wire, SIM-RS485-OPTO, SIM-20mA (only passive / passive), DUAL-ISM
<b>Digital I/O Modules 2 x PIM</b>	2 optoisolated digital inputs (12–24 VDC / 7 mA) 2 optoisolated digital outputs (12–24 VDC / 100 mA)
<b>Analog Output Module 2 x DAU</b>	1 analog output related to gross or net weight, 0–20 mA, 4–20 mA, 0–10 V, 2–10 V selectable
<b>Analog Input Module, 2 x ADI</b>	1 analog input 0–20 mA, 4–20 mA, 0–10 V, 2–10 V selectable
<b>Ethernet/IP Extension Module, 1 x ETX</b>	ETX Ethernet/IP Interface 10 MBit/s, 100 MBit/s
<b>PROFINET Extension Module, 1 x PNX</b>	PNX PROFINET Interface 10 MBit/s, 100 MBit/s
<b>Profibus DP Extension Module, 1 x PBX</b>	PBX Profibus DP Interface 12 MBit
<b>I/O Extension Module 1 x SPU</b>	2 sockets for serial interface modules (SIM) 2 sockets for digital I/O modules (PIM)
<b>WLAN Extension Module, 1xWLX</b>	Connection to wireless local area networks

## 20.2 ITX000ET External Power Supply Unit

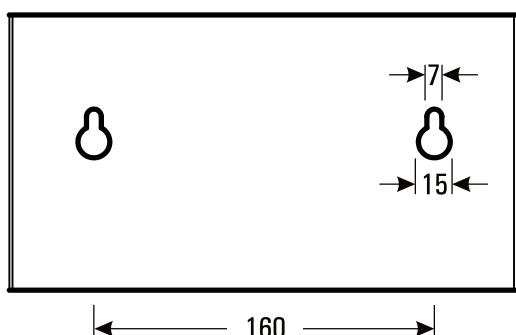
<b>Construction</b>	Aluminum housing for wall-mount / desk-top installation, protected to IP66, weight: approx. 1 kg
<b>Temperature Range</b>	Storage: -25 °C to +70 °C at 95 % relative humidity max. without condensation Operation: -10 °C to +40 °C at 95 % relative humidity max. without condensation
<b>Input:</b>	Input voltage: 110 VAC (-15 %) – 240 VAC (+10 %) Frequency: 47–63 Hz Current consumption: 0.4–0.2 A
<b>Output:</b>	Output voltage: 12 VDC Output current: 2.0 A
<b>Electrical Safety</b>	Separation between primary and secondary circuits SELV, in accordance with EN 60950

## 21 Dimensions

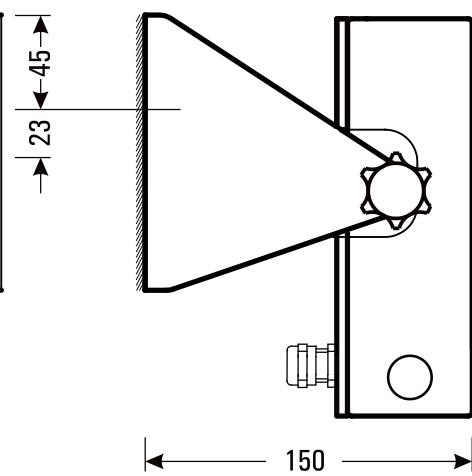
### 21.1 IT8000ET



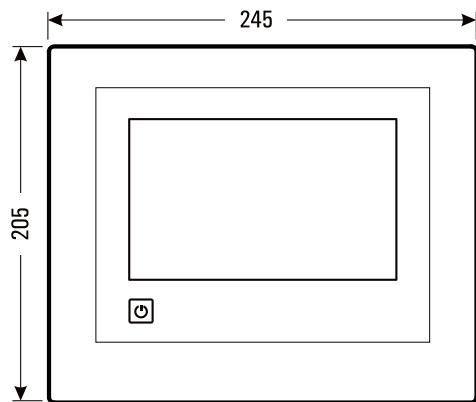
Fixing holes



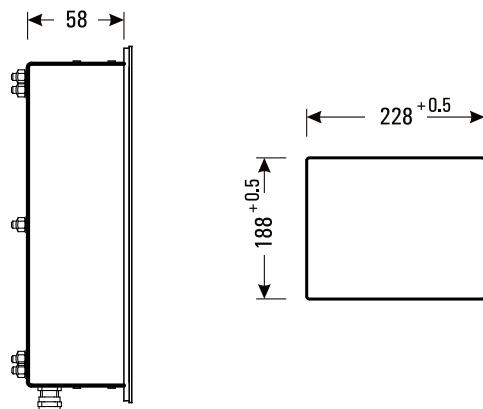
Wall-mount installation



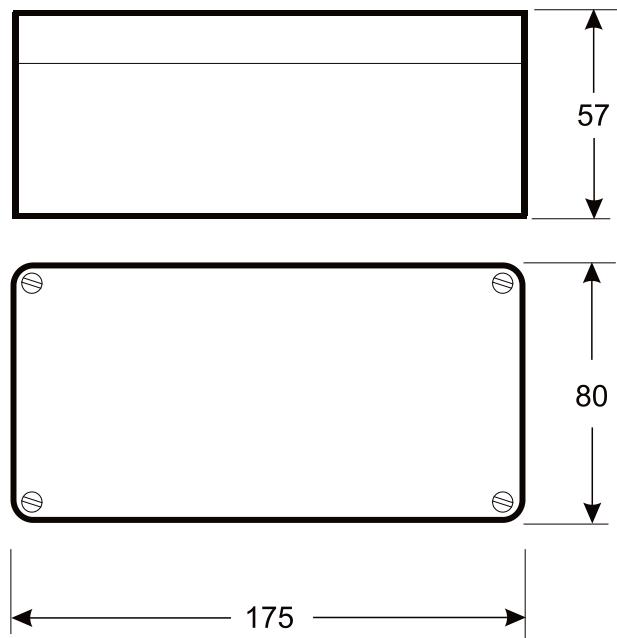
Panel-mount installation



Cutout in panel



## 21.2 ITX000ET External Power Supply Unit



## 22 Service Password

The service password is required to access the Service Mode.

The password is: 2234

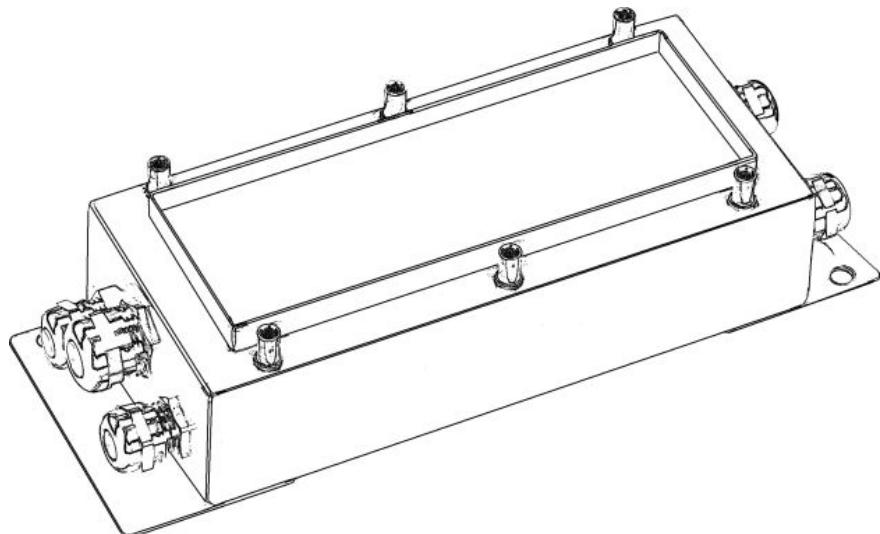
If you want to prevent unauthorized access to the Service Mode, remove this page from the manual and keep it in a safe place.

If access to the 'Settings' menu of the application program is protected by a *User Password*, also entry of the *Service Password* is accepted. This might be helpful in cases when the User Password is not available any more.

---

## Technical Manual

# JunctionBox



10ZUB458

February 2016

ST.2309.1517

Rev. 4



## **Technical Manual JunctionBox**

Date: February 22, 2016

File: JUNCTIONBOX.THE.DOC

**Published By:**

© SysTec Systemtechnik und Industrieautomation GmbH, Bergheim, Germany

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, mechanical, photocopying, recording, or otherwise, without the prior written permission of SysTec GmbH.

Terms and product names mentioned in this publication are trademarks, registered trademarks or service marks of their respective owners. Use of a term should not be regarded as affecting the validity of any trademark, registered trademark or service mark.

**Please Note:**

While every precaution has been taken in the preparation of this manual, SysTec GmbH assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein.

The publisher is grateful for any information and/or advice that may contribute to correct errors or omissions in following editions.

## Contents

<b>1 Introduction .....</b>	<b>7</b>
1.1 About This Manual .....	7
1.2 Safety Symbols Used In This Manual .....	7
1.3 Safety Advice .....	7
1.4 Declaration Of Conformity EU (only valid until April 19, 2016) .....	8
<b>2 Marking.....</b>	<b>9</b>
<b>3 Description .....</b>	<b>9</b>
3.1 General Description .....	9
3.2 Housing .....	9
3.3 Shift Adjust Board.....	10
<b>4 Intended Use .....</b>	<b>10</b>
<b>5 Assembly .....</b>	<b>11</b>
<b>6 Installation.....</b>	<b>12</b>
6.1 General .....	12
6.2 Equipotential Bonding .....	12
6.3 Shielding .....	12
6.4 Configuration For 4- or 6-Wire Mode.....	12
6.5 Connection Of The Loadcells .....	13
6.6 Connection Of The Weighing Terminal .....	15
6.7 Installation Example .....	16
6.8 Installation Of Cables .....	17
<b>7 Commissioning.....</b>	<b>18</b>
7.1 General .....	18
<b>8 Operation .....</b>	<b>18</b>
<b>9 Shift Adjust Procedure .....</b>	<b>19</b>
<b>10 Transport, Maintenance And Cleaning.....</b>	<b>20</b>
10.1 Transport .....	20
10.2 Maintenance .....	20
10.3 Cleaning .....	20
10.4 Security Check .....	20
10.5 Functional Test.....	21
10.6 Repair .....	21
10.7 De-Installation .....	21
10.8 Disposal .....	21
<b>11 Trouble Shooting .....</b>	<b>21</b>
<b>12 Technical Data .....</b>	<b>22</b>
<b>13 Dimensions .....</b>	<b>22</b>



# 1 Introduction

## 1.1 About This Manual

This manual contains information and technical data for the use, the installation and the operation of the JunctionBox.

## 1.2 Safety Symbols Used In This Manual

Safety relevant information is shown with corresponding symbols as follows:



### W A R N I N G

Failure to observe this precaution could result in serious injuries or fatal accidents. Please make absolutely sure that these precautions are observed in order to ensure safe operation of the equipment.

Note:

- This indicates an advice for the intended use of the equipment and/or additional information to avoid inappropriate handling.

## 1.3 Safety Advice



### W A R N I N G

This module and its associated equipment must only be installed, adjusted and maintained by qualified personnel!



### W A R N I N G

When this unit is included as a component part of a system, the resulting system design must be reviewed by qualified personnel who are familiar with the construction and operation of all individual components in the system. All chapters of the Technical Manual must be observed.



### W A R N I N G

For installation, service and operation of the unit, all locally applicable regulations for safety and prevention of accidents must be observed!

Notes:

- Disconnect all power to this instrument before cleaning and servicing!
- Keep this manual for future reference!

## 1.4 Declaration Of Conformity EU (only valid until April 19, 2016)

SysTec Systemtechnik und Industrieautomation GmbH  
 Ludwig-Erhard-Str. 6  
 D 50129 Bergheim-Glessen



# Konformitätserklärung

*Declaration of conformity*

Déclaration de conformité

Die JunctionBox  
*The JunctionBox*  
 Le JunctionBox

Hersteller: <i>Manufacturer:</i> Fabricant:	SysTec GmbH
Typ/Modell: <i>Type/Model:</i> Type/modèle:	JunctionBox

entspricht den Anforderungen der folgenden Richtlinien:  
*corresponds to the requirements of the following EC directives:*  
 correspond aux exigences des directives CE suivantes:

2004/108/EG      2004/108/EC      2004/108/CE

entsprechend den folgenden Normen:  
*in conformity with the following standards:*  
 conforme aux normes suivantes:

EN 61000-6-2:2005    EN 61000-6-4:2001

Unterschrift

*Signature*

Signature

Datum 26. Juni 2012

Date June 26, 2012

Date 26<sup>er</sup> Juin 2012

Dipl.-Ing. Rainer Junglas  
 Geschäftsführer  
*General Manager*  
 Directeur

## 2 Marking

Manufacturer	Systec Systemtechnik und Industrieautomation GmbH
	Ludwig-Erhard-Straße 6
	50129 Bergheim-Glessen
Designation	JunctionBox
Serial-No. SN	yyxxxxxx
Operating temperature range:	-10°C ... + 40°C
CE marking	
Service	Only by qualified service personnel, addresses on request.

## 3 Description

### 3.1 General Description

The shift adjust junction box is intended for connection to a supply circuit of a weighing terminal and the connection, excitation and cornering of up to 4 strain gauge loadcells.

The loadcells may be connected in 4- or 6-wire mode. The junction box is connected to the weighing terminal in 6-wire mode.

The shift adjust board of the JunctionBox features potentiometers to adjust the differences in weight of the individual corners. Shift adjust is enabled when the sliding switches are closed. To disable the shift adjust function the sliding switches must be open.

### 3.2 Housing

The housing of the JunctionBox is made of stainless steel. It has 4 M16x1.5 cable glands (4 - 8 mm) for loadcell cables and 1 M16x1.5 cable gland (5 - 10 mm) for the homerun cable to the weighing terminal.

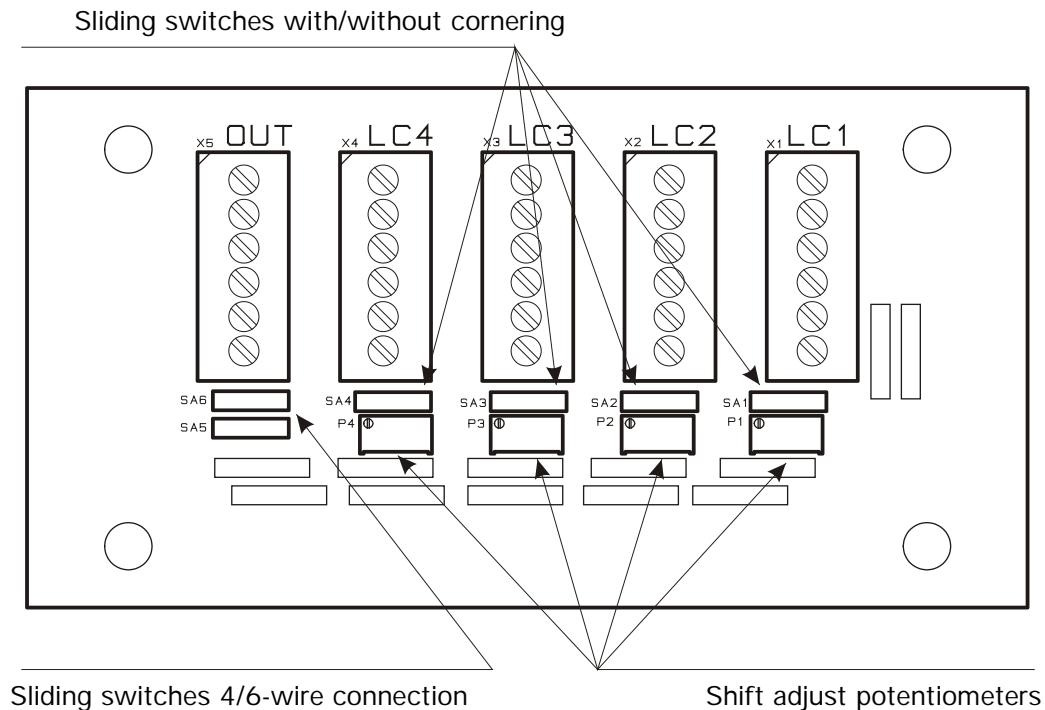
The housing is protected to IP67.

The housing must be included in the equipotential bonding of the installation with the bonding conductor connected at the M5 stud at the outside of the housing.

### 3.3 Shift Adjust Board

Incorporated in the housing is the shift adjust board ST.2300.0122.002.

- Up to 4 strain gauge loadcells can be connected at the screw terminals LC1 - LC4. At the terminal strip OUT the excitation circuit of the weighing terminal is connected.
- The potentiometers P1 - P4 are used to adjust the corners of the understructure. To that effect the sliding switches SA1 - SA4 must be closed.
- When loadcells are connected in 4-wire mode, the sliding switches SA5 - SA6 must be closed.



## 4 Intended Use

	<p>Any other but the intended use of the equipment, modifications and extensions must not be made without the explicit approval of the manufacturer and is deemed not to be intended. Part of the intended use is observance of this Technical Manual and the adherence to inspection and maintenance instructions and intervals. The manufacturer does not assume any liability whatsoever for damages resulting from non-intended use. Any risk resulting from non-intended use is solely borne by the user.</p>
	<p>By means of the M5 bolt, the metal housing of the JunctionBox must be connected to the equipotential bonding system of the installation.</p>
	<p>The connection values according to chapter "Technical Data" must be observed.</p>
	<p>The permissible temperature range is –10°C to + 40°C.</p>

## 5 Assembly

Assembly must be made in strict compliance with all applicable regulations and generally accepted engineering standards. In particular the special safety regulations for work on electrical systems must be observed.

The unit must be undamaged and the place of installation must be clean. For installation the device has mounting brackets with a 6 mm mounting hole each. It must be firmly installed by means of suitable mounting accessories that are not part of the delivery. All screws must be securely tightened.

The housing must be included in the equipotential bonding of the installation with the bonding conductor connected at the M5 stud provided.

Prior to commissioning, the lid of the housing must be closed and securely tightened with the hexagonal screws that are part of the shipment. The screws must be tightened with a torque of 1.2 Nm.

## 6 Installation

### 6.1 General

	This apparatus may only be installed by qualified personnel. This level of competence must correspond to the work that is to be carried out and appropriate training should be provided on a regular basis.
	Switch off the main switch and disconnect all power to the installation before carrying out any installation or maintenance work. Make sure that power cannot be switched on again. Installation work may only be carried out with all power sources disconnected.
	Installation must be carried out in compliance with applicable DIN/VDE regulations. Also, all country-specific regulations must be observed.
	All cables are led into the housing of the JunctionBox through glands. Use wire end ferrules on stranded cable and avoid protruding wires. When assembling the cable glands make sure that shield of cable is connected inside the cable gland (see also section 'Installation Of Cables').
	Prior to operating the device, the lid of the housing must be closed and secured against reopening with all hexagonal screws provided. The screws must be tightened with a torque of 1.2 Nm.

### 6.2 Equipotential Bonding

	The device must be integrated into the equipotential bonding of the installation. The bonding conductor must have a cross section of min. 4mm <sup>2</sup> . To connect the bonding conductor, an M5 stud is provided at the housing.
------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

### 6.3 Shielding

	Use only shielded connection cables. The shield must be connected at both sides in the cable glands. It is mandatory to additionally install equipotential bonding. The bonding conductor must have a cross section of min. 4mm <sup>2</sup> .
-------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

### 6.4 Configuration For 4- or 6-Wire Mode

Disassemble lid of JunctionBox with 7 mm wrench.

To connect loadcells in 6-wire mode, sliding switches SA5 and SA6 must be open.

To connect loadcells in 4-wire mode, sliding switches SA5 and SA6 must be closed.

Number of wires in loadcell cable	Sliding switches SA5 and SA6	Function
6	open	with sense lines
4	closed	without sense lines

## 6.5 Connection Of The Loadcells

Disassemble lid of JunctionBox with 7 mm wrench. Install cables of loadcells LC 1 - LC 4 in M16x1.5 (4 - 8 mm) cable glands. Strip cable jacket as long as required for the free wires to reach the pertaining screw terminals LC 1 to LC 4. Use wire end ferrules on stranded cable. Make sure that shield of cable is connected inside the cable gland (see section 'Installation of cables').

The wires of the loadcell cable are connected as follows:

Terminal strip LC1 (loadcell 1):

Designation	Function
+ EXC	+ Excitation loadcell 1
-EXC	- Excitation loadcell 1
+ SEN	+ Sense loadcell 1
-SEN	- Sense loadcell 1
+ SIG	+ Signal loadcell 1
-SIG	- Signal loadcell 1

Terminal strip LC2 (loadcell 2):

Designation	Function
+ EXC	+ Excitation loadcell 2
-EXC	- Excitation loadcell 2
+ SEN	+ Sense loadcell 2
-SEN	- Sense loadcell 2
+ SIG	+ Signal loadcell 2
-SIG	- Signal loadcell 2

Terminal strip LC3 (loadcell 3):

Designation	Function
+ EXC	+ Excitation loadcell 3
-EXC	- Excitation loadcell 3
+ SEN	+ Sense loadcell 3
-SEN	- Sense loadcell 3
+ SIG	+ Signal loadcell 3
-SIG	- Signal loadcell 3

**Terminal strip LC4 (loadcell 4):**

Designation	Function
+ EXC	+ Excitation loadcell 4
-EXC	- Excitation loadcell 4
+ SEN	+ Sense loadcell 4
-SEN	- Sense loadcell 4
+ SIG	+ Signal loadcell 4
-SIG	- Signal loadcell 4

The following connection values must be observed:

Cross section of rigid wires:	0.14 – 1.5 mm <sup>2</sup>
Cross section of stranded wires with wire end ferrules:	0.25 – 1.5 mm <sup>2</sup>
Length of stripped wire:	6 mm
Torque of screw terminal:	0.5 – 0.6 Nm

## 6.6 Connection Of The Weighing Terminal

The cable from the supply circuit is connected through the M16x1.5 (5 - 10 mm) cable gland of the JunctionBox. Strip cable jacket as long as required for the free wires to reach the screw terminal OUT. Use wire end ferrules on stranded cable. Make sure that shield of cable is connected inside the cable gland (see section 'Installation of cables').

The wires of the cable are connected at the terminal strip OUT of the shift adjust board as follows:

Terminal strip OUT (supply circuit)

Designation	Function
+ EXC	+ Excitation
-EXC	- Excitation
+ SEN	+ Sense
-SEN	- Sense
+ SIG	+ Signal
-SIG	- Signal

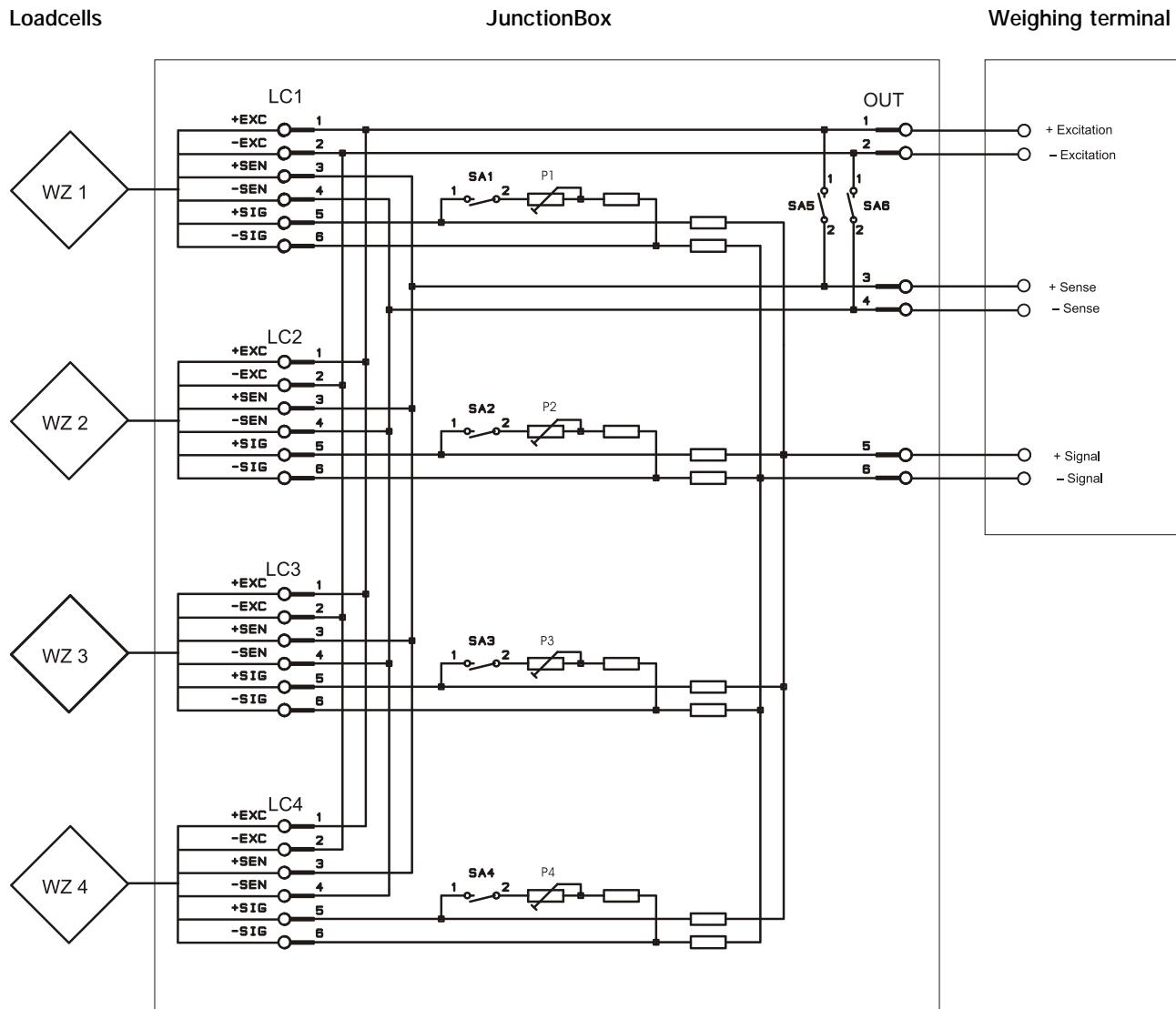
The following connection values must be observed:

Cross section of rigid wires:	0.14 – 1.5 mm <sup>2</sup>
Cross section of stranded wires with wire end ferrules:	0.25 – 1.5 mm <sup>2</sup>
Length of stripped wire:	6 mm
Torque of screw terminal:	0.5 – 0.6 Nm

After connecting all cables, close lid with the M4 hexagonal screws provided and fasten with a torque of 1.2 Nm.

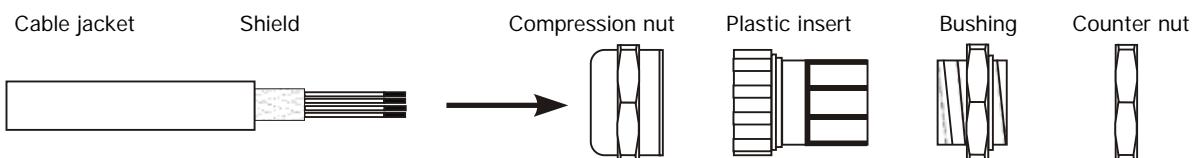
## 6.7 Installation Example

Shown below is a typical configuration:

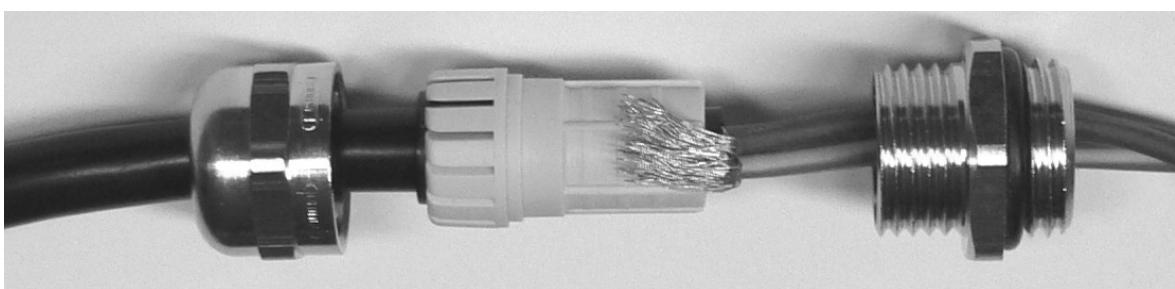


## 6.8 Installation Of Cables

All cables are led into the housing through cable glands.



1. Slide compression nut over cable jacket;
2. Slide plastic insert (retainer) over cable jacket until inner end is aligned with cut end of jacket;
3. Unravel shield, bend over retainer and push into retaining comb to ensure good conductive contact with housing. Cut wires of shield to length of comb, avoid protruding wires that would endanger tightness of cable gland;



4. Insert retainer with cable into bushing;
5. Screw compression nut onto bushing and use wrench to tighten securely.

Permissible diameter of cable and torque for cable glands:

Type of cable gland	Size of wrench for compression nut	Permissible diameter of cable	Torque of compression nut
M16x1.5 (5 - 10 mm)	20 mm	5 – 10 mm	5 Nm
M16x1.5 (4 - 8 mm)	17 mm	4 – 8 mm	6 Nm

For deviating diameters of cable contact SysTec service.

-  Use crimped wire end ferrules with plastic collar on stranded cables and avoid protruding wires!
-  All connection cables must be firmly installed to avoid tensile strain at the cable glands.

## 7 Commissioning

### 7.1 General

Prior to start up follow the check list below:

	Check whether the conditions concerning the intended use are fulfilled (see section 'Intended Use').
	Check assembly as described in section 'Assembly'.
	Check of installation (equipotential bonding, connection of external components) as described in chapter 'Installation'.
	Check that housing is properly closed with all hexagonal screws securely tightened with a torque of 1.2 Nm.
	Switch on the connected weighing terminal.

## 8 Operation

The JunctionBox does not have any control elements and does not require any operator interaction. It is a firmly installed part of the weighing installation. Operation of the installation is made at the connected weighing terminal.

The procedure for shift adjust is described in section 'Shift Adjust Procedure'.

## 9 Shift Adjust Procedure

The JunctionBox has 4 potentiometers which are used to adjust the 4 corners of a weighing platform.

Assignment of loadcells, potentiometers and sliding switches:

Loadcell	Terminal strip	Potentiometer	Sliding switch
1	LC1	P1	SA1
2	LC2	P2	SA2
3	LC3	P3	SA3
4	LC4	P4	SA4

By default the sliding switches SA1 - SA4 are open. In this position shift adjust is disabled.

How to carry out the shift adjust procedure:

- Disconnect all power sources to the installation.
- Open lid of housing with suitable tool.
- Close sliding switch SA1 - SA4 (position 'ON').
- Turn potentiometers P1 - P4 clockwise to end (in end position you can hear a light clicking noise).
- Switch on weighing terminal.
- Calibrate scale.
- Load corners of platform one after the other with the same test weight (approx. 25% of capacity) to determine corner with the lowest reading. This corner #1 is not changed anymore and serves as reference for the others.
- Adjust the remaining three corners as follows:
  - Put test weight on corner;
  - Turn pertaining potentiometer counter clockwise until the lower weight reading of corner #1 is reached.
- Check all corners, if necessary repeat procedure until all corners are within permissible limits.
- Check full capacity of scale, it might be required to repeat calibration to full load after shift adjust.
- After completing the shift adjust procedure close lid of JunctionBox and tighten screws securely with a torque of 1.2 Nm.

## 10 Transport, Maintenance And Cleaning

### 10.1 Transport

Note:

- Transport and storage of the weighing terminal must only be made in designated cardboard box.
- Do not expose the unit to extreme temperatures, humidity, shocks or vibrations.
- Storage temperature 0 to + 70°C at 95% max. relative humidity without condensation

### 10.2 Maintenance



Maintenance at regular intervals must be carried out by qualified personnel (see chapter 'Installation'). At these inspections first of all it must be made sure that the housing is tight, all cables are undamaged and all screws are securely fastened.

Maintenance of the connected scale platform is required at regular intervals depending on use and environment. The accuracy of scales can be affected by dirt, foreign objects, etc. and appropriate maintenance is strongly recommended. Also recommended is the calibration with certified test weights at regular intervals.

### 10.3 Cleaning

Clean the unit with a soft clean cloth that has been dampened with a mild window type cleaner. Do not spray cleaner directly on the unit. Concentrated leaches or acids or pure alcohol must not be used. If cleaning agents are used that contain leach, acid or alcohol, pure water must be used to wash off any residue. The unit is protected to IP67.

### 10.4 Security Check



Safe operation is no longer warranted if:

- Housing is damaged.
- Connected cables, cable entry or equipotential bonding are damaged.

In these cases disconnect all power to the unit and contact your service station.

## 10.5 Functional Test

The functionality of the JunctionBox is tested with test weights during the calibration of the scale and the shift adjust procedure.

## 10.6 Repair



Immediately disconnect a damaged unit from all power sources.

Only qualified service personnel (see chapter 'Installation') may carry out repair work using genuine factory supplied spare parts.

## 10.7 De-Installation



1. Disconnect all power sources to the installation.
2. Open lid with suitable tool.
3. Remove cabling.
4. Use suitable tools to de-install JunctionBox.

## 10.8 Disposal

For the disposal of the unit all country-specific and locally applicable regulations must be observed!

# 11 Trouble Shooting



The JunctionBox does not contain any customer serviceable parts!

Only qualified service personnel (see chapter 'Installation') may carry out repair work using genuine factory supplied spare parts.

If any problem arises, please follow this check list:

- Disconnect the unit from all power sources.
- Check whether all cables including cable glands are undamaged.
- Check whether housing is undamaged.

If operational difficulties are encountered that cannot be rectified by means of this manual, obtain as much information as possible regarding the particular trouble.

If possible, try first to determine the conditions under which the problem occurs. Try to find out whether the appearance of the difficulties can be reproduced under the same conditions.

For the systematic analysis of an unknown problem the information as listed below is required:

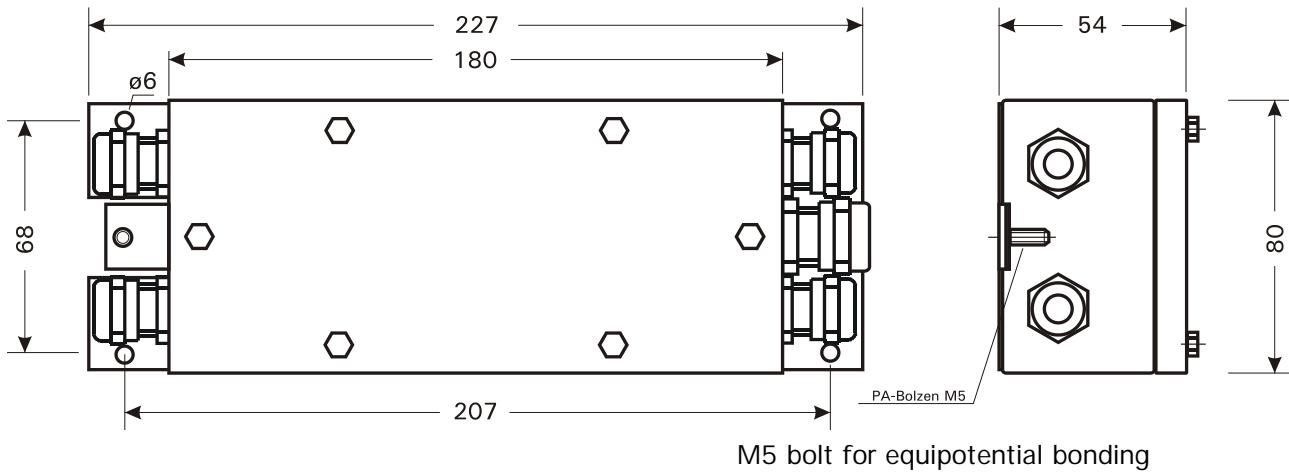
- Serial-No. of the unit.
- Exact wording of any error message shown on the display of the connected weighing terminal.
- Type and model of the weighing terminal.

To obtain professional assistance contact your service station stating the information listed above.

## 12 Technical Data

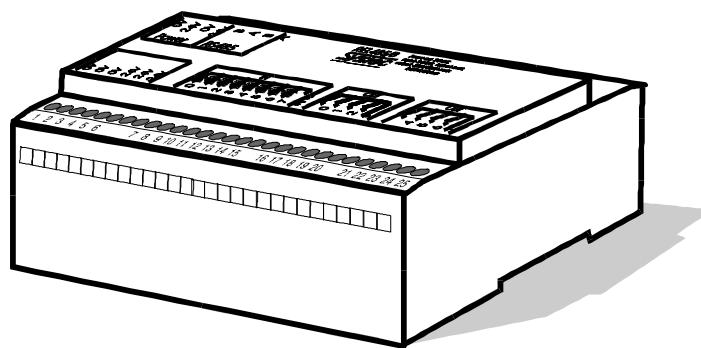
Housing	Stainless steel housing with mounting flange and 5 cable glands
Ingress protection	IP67
Weight	0.75 kg
Temperature range storage	0 °C to + 70 °C at 95 % rel. humidity, non-condensing
Temperature range operation	-10 °C to + 40 °C at 95 % rel. humidity, non-condensing
Max. surface temperature	50°C
Min. Loadcell resistance X1-X4 (LC1-4)	200 Ohm each Loadcell
Connection values X5 (OUT)	$U_N = 0 - 20 \text{ V}$ $I_N = 0 - 0.4 \text{ A}$

## 13 Dimensions



## Installation Instructions

# REL485 / TRIO485



RS485 Relay / Transistor Unit

February 2016

ST.2309.0047

Rev. 15



## **Installation Instructions REL485 / TRIO485**

Date: February 05, 2016

File: REL\_TRIO\_IAE.DOC

**Published By:**

SysTec GmbH, Ludwig-Erhard-Str.6, D-50129 Bergheim-Glessen, Germany

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, mechanical, photocopying, recording, or otherwise, without the prior written permission of SysTec GmbH.

Copyright © 2012 by SysTec GmbH

Terms and product names mentioned in this publication are trademarks, registered trademarks or service marks of their respective owners. Use of a term should not be regarded as affecting the validity of any trademark, registered trademark or service mark.

**Please Note:**

While every precaution has been taken in the preparation of this manual, SysTec GmbH assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein.

The publisher is grateful for any information and/or advice that may contribute to correct errors or omissions in following editions.

## Contents

<b>1 Introduction .....</b>	<b>7</b>
1.1 Applications.....	7
1.2 Documentation.....	7
1.3 Safety Symbols Used In This Manual .....	7
1.4 Safety Advice .....	8
1.5 Technical Data .....	9
<b>2 Declaration Of Conformity EU (only valid until April 19, 2016).....</b>	<b>10</b>
<b>3 Installation .....</b>	<b>11</b>
3.1 RS485 4-Wire Interface In Weighing Terminal IT4000E / IT6000E / IT8000E / IT9000E.....	11
3.2 RS485-2-Wire Interface In Weighing Terminal IT6000 / IT8000 / IT9000 .....	11
3.3 RS485-4-Wire Interface In TS3000 Separating Module.....	11
3.4 Service Mode Parameters Of Weighing Terminals IT4000E / IT6000E / IT8000E / IT9000E.....	12
3.5 Service Mode Parameters Of Weighing Terminals IT6000 / IT8000 / IT9000 .....	12
3.6 Settings For Relay/Transistor Module .....	13
3.7 Connection .....	15
3.8 Wiring Schematics (Examples).....	16
3.9 Wiring Schematics 4-Wire Interface For Weighing Terminal IT4000E / IT6000E / IT8000E / IT9000E.....	18
3.10 Wiring Schematics 2-Wire Interface For Weighing Terminal IT6000/IT8000/IT9000.....	20
3.11 Wiring Schematics 4-Wire Interface For TS3000.....	22
3.12 Functional Test .....	24
3.13 Address Of Inputs/Outputs .....	26
3.14 Errors .....	26
<b>4 Terminal Assignment .....</b>	<b>27</b>
<b>5 Dimensions .....</b>	<b>28</b>



## 1 Introduction

### 1.1 Applications

The RS485 Relay/Transistor Module is used in combination with a weighing terminal for the input and output of digital signals. Typical applications are switching on/off solenoid valves, pilot lamps and motor control centers. Via the optoisolated inputs, push buttons, switches and sensors can be connected.

### 1.2 Documentation

In addition to this manual, further information is provided in the following technical manuals:

- IT2000M, Order-No. ST.2309.1640
- IT3000M, Order-No. ST.2309.1501
- IT4000E, Order-No. ST.2309.1193
- IT6000E, Order-No. ST.2309.1204
- IT6000ET, Order-No. ST.2309.1476
- IT8000E, Order-No. ST.2309.1188
- IT8000ET, Order-No. ST.2309.1472
- IT9000E, Order-No. ST.2309.0813
- IT9000, Order-No. ST.2309.0019
- IT8000, Order-No. ST.2309.0426
- IT6000, Order-No. ST.2309.0799
- TS3000, Order-No. ST.2309.0769

### 1.3 Safety Symbols Used In This Manual

Safety relevant information is shown with corresponding symbols as follows:



#### W A R N I N G

Failure to observe this precaution could result in serious injuries or fatal accidents. Please make absolutely sure that these precautions are observed in order to ensure safe operation of the equipment.

#### ! CAUTION

- Failure to observe this precaution could result in damage to or destruction of the equipment or bodily harm! Please make absolutely sure that these precautions are observed in order to ensure safe operation of the equipment.

**Note:** This indicates an advice for the correct operation of the equipment and additional information to avoid inappropriate handling.

## 1.4 Safety Advice



### WARNING

Exercise utmost care when making checks, tests and adjustments that can actuate movable parts such as feeding devices, gates, flaps, conveyors, etc. Make absolutely sure that nobody is within reach of movable parts.



### CAUTION

- This module and its associated equipment must be installed, adjusted and maintained by qualified personnel only!



### CAUTION

- It must be installed, serviced and operated in strict compliance with all locally applicable safety regulations and the rules for the prevention of accidents!



### CAUTION

- For the power supply of the RS485 relay/transistor module an external power supply unit is required providing 24 VDC SELV voltage in compliance with EN60950.



### CAUTION

- When this unit is included as a component part of a system, the resulting system design must be reviewed by qualified personnel who are familiar with the construction and operation of all individual components in the system and the potential hazards involved. Failure to observe this precaution could result in bodily injury!

- Read this manual carefully before you operate this module!
- Keep this manual for future reference!

## 1.5 Technical Data

The RS485-Relay/Transistor Module is connected serially via an RS485 interface to the IT9000/ IT6000 weighing terminal. The module is installed in a switch cabinet on a C-rail. A maximum number of 8 modules can be addressed via one RS485 interface.

	REL485 Relay Module	TRIO485 Transistor Module
8 inputs	Optoisolated 24V inputs, common <b>IN</b> – connection Low level: 0 – 2 VDC High level: 19.5V – 30 VDC	
8 outputs	Relay output, electrically isolated, 24VDC/2A or 250VAC/2A, N/O-contact, 4 each with one common connection	Transistor output, optoisolated, 24VDC/1A, 4 each with one common L+ connection
max. switching frequency of outputs	10Hz	100Hz
power supply	$U_{in} = 24VDC$ $I_{in} = 100 \text{ mA}$ (without load on outputs) For the power supply, an external SELV power supply unit is required in compliance with EN60950.	
Serial interface RS485-2-wire	To connect to weighing terminal IT6000/IT8000/IT9000 and up to 7 additional relay/transistor modules, signal transmission time approx. 3 msec, max. cable length: 1000 m	
Serial interface RS485-4-wire	To connect to weighing terminal IT4000E / IT6000E / IT8000E / IT9000E and to separating module TS3000 in safe area and up to 7 additional relay/transistor modules, signal transmission time approx. 3 msec, max. cable length: 1000 m. (Only REL485 index 007 and TRIO485 index 005 or higher.)	
Status indication of I/Os	LEDs for state of 8 inputs and 8 outputs	

## 2 Declaration Of Conformity EU (only valid until April 19, 2016)

SysTec Systemtechnik und Industrieautomation GmbH  
 Ludwig-Erhard-Str. 6  
 D-50129 Bergheim-Glessen



### Konformitätserklärung *Declaration of conformity* *Déclaration de conformité*

**Das Relais- / Transistormodul**

*The relay / transistor module*

Le couplage de relais / transisteurs

<b>Hersteller:</b> <i>Manufacturer:</i> Fabricant:	SysTec GmbH
<b>Typ/Modell:</b> <i>Type/Model:</i> Type/modèle:	REL 485 / TRIO 485

**entspricht den Anforderungen der folgenden Richtlinien:**

*corresponds to the requirements of the following EC directives:*

*correspond aux exigences des directives CE suivantes:*

2004/108/EG 2006/95/EG	2004/108/EC 2006/95/EC	2004/108/CE 2006/95/CE
---------------------------	---------------------------	---------------------------

**entsprechend den folgenden Normen/Empfehlungen:**

*in conformity with the following standards:*

*conforme aux normes suivantes:*

EN 61000-6-4:2007 EN 60950-1:2006	EN 61000-6-2:2005
--------------------------------------	-------------------

**Unterschrift**

*Signature*

Signature

**Datum:**

**24.02.2011**

*Date:*

*February 24, 2011*

*Date:*

**24.02.2011**

Dipl.-Ing. Rainer Junglas

Geschäftsführer / General Manager / Directeur

### 3 Installation

#### 3.1 RS485 4-Wire Interface In Weighing Terminal IT4000E / IT6000E / IT8000E / IT9000E

The RS485 interface module SIM RS485-4-wire or SIM RS485-Opto is installed in one of the sockets **SIM1 or SIM2** (in the IT9000E terminal also in **SIM3**), (see also Technical Manual of weighing terminal).

Note: In the IT9000E terminal the sockets SIM1-SIM2 can alternatively be used for the SIM RS485-2-wire module.

#### 3.2 RS485-2-Wire Interface In Weighing Terminal IT6000 / IT8000 / IT9000

The RS485 interface module SIM RS485-2-wire or SIM RS485-Opto is installed in one of the sockets **SIM1 or SIM2** (in the IT9000 terminal also **SIM3**).

In the IT6000 terminal the sliding switch for the interface COM1 or COM2 must be set to RS485 (see also Technical Manual IT6000).

In the IT6000A/2006 terminal the RS485 interface module SIM RS485-2-wire or SIM RS485-Opto is installed in one of the sockets **SIM1 or SIM2** (see also Technical Manual IT6000A/2006).

In the IT9000 terminal jumpers must be plugged into pin row W1 and W2 next to the screw terminals **in the middle position** (see also Technical Manual IT9000).

#### 3.3 RS485-4-Wire Interface In TS3000 Separating Module

A separating module TS3000 with RS485.4 interface must be used. All components must only be installed in safe area (see also Technical Manual TS3000).

### **3.4 Service Mode Parameters Of Weighing Terminals IT4000E / IT6000E / IT8000E / IT9000E**

The digital I/O modules are controlled via the 'DeviceBus' protocol. Mixed mode operation together with analog I/O modules (MAI) and the ADCBox is possible.

For the communication with an RS485 module, the option 'REL/TRIO' must be chosen in Service Mode, group 'Configuration IO', for the corresponding interface 'SIM1', 'SIM2' or 'SIM3' (IT9000E only).

In Service Mode group 'Interface' the parameters of the COM interface used for the RS485 communication must be set to 19200 baud, 8 data bits, odd parity, no control, no protocol.

### **3.5 Service Mode Parameters Of Weighing Terminals IT6000 / IT8000 / IT9000**

The digital I/O modules are controlled via the 'DeviceBus' protocol. Mixed mode operation together with analog I/O modules (MAI) and the ADCBox is possible.

To connect RS485 REL/TRIO modules the option 'DeviceBus' must be selected for the chosen interface (COM1 or COM2) of the weighing terminal. Die Parameters for COM1 or COM2 (or COM3 for IT8000) must be set in Service Mode as follows: 19200 baud, 8O, HDX, ext. bus, I/O-Module, DeviceBus.

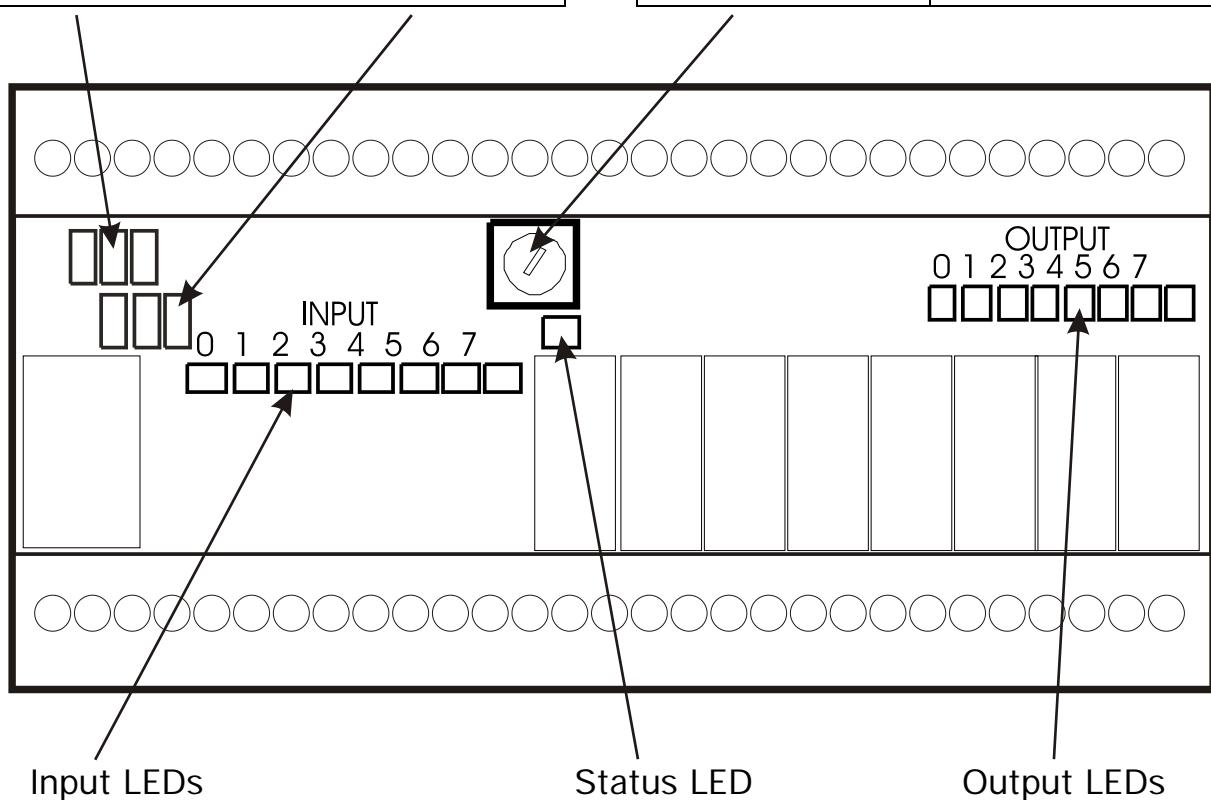
### 3.6 Settings For Relay/Transistor Module

Addresses of the connected modules are set beginning with address 0 up to address 7. Termination resistors are connected by means of jumpers on modules which are installed at a physical end of the RS485 network.

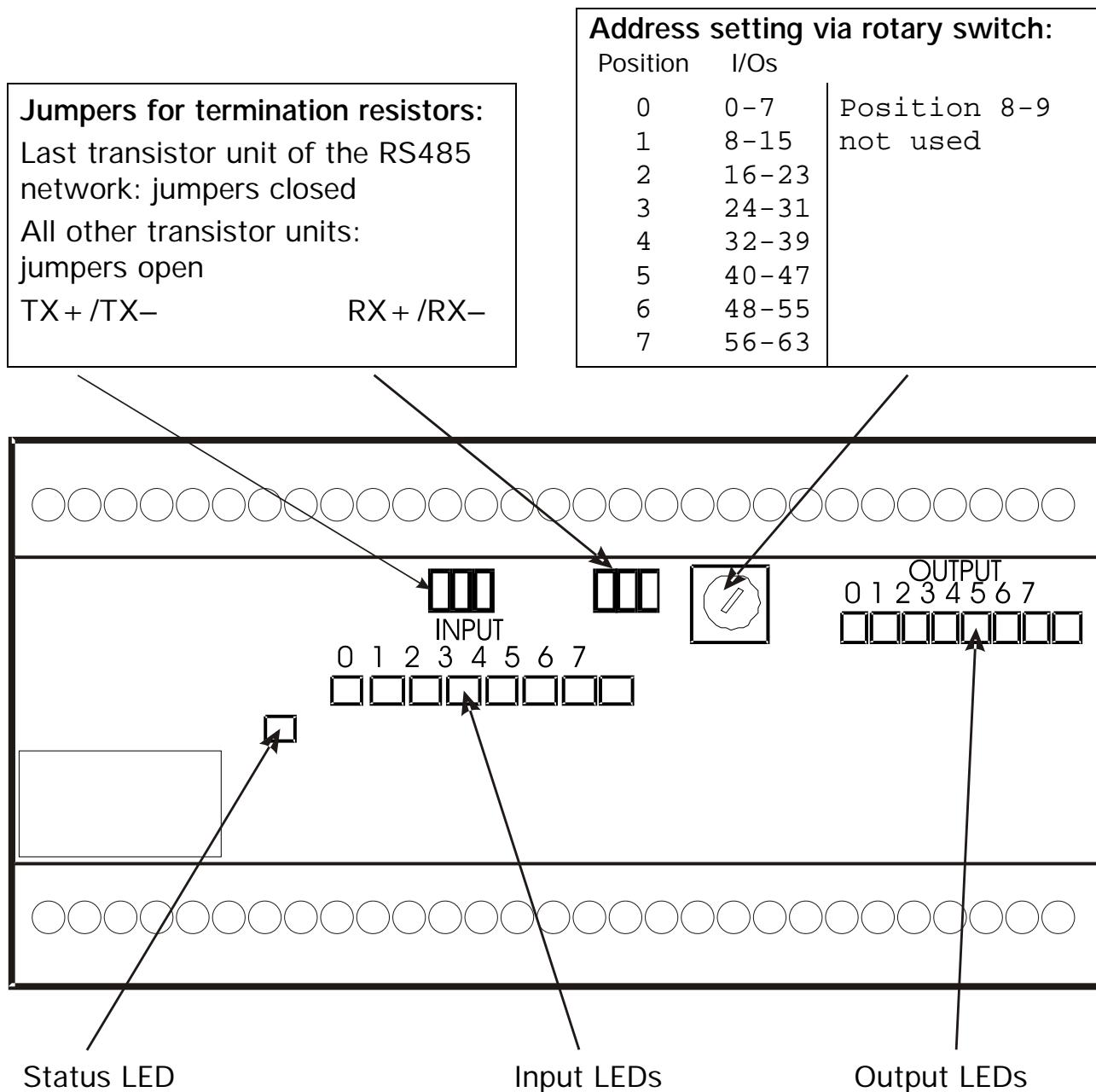
**Note:** Even if PIM modules are installed in the weighing terminal, the addresses of the relay modules always start with the zero position of the rotary switch.

### 3.6.1 REL485 Relay Module

Jumpers for termination resistors:		Address setting via rotary switch:		
		Position	I/Os	
Last relay unit of the RS485 network:	jumpers closed	0	0-7	Position 8-9
All other relay units:	jumpers open	1	8-15	not used
TX+ /TX-	RX+ /RX-	2	16-23	
		3	24-31	
		4	32-39	
		5	40-47	
		6	48-55	
		7	56-63	



### 3.6.2 TRIO485 Transistor Module



### 3.7 Connection

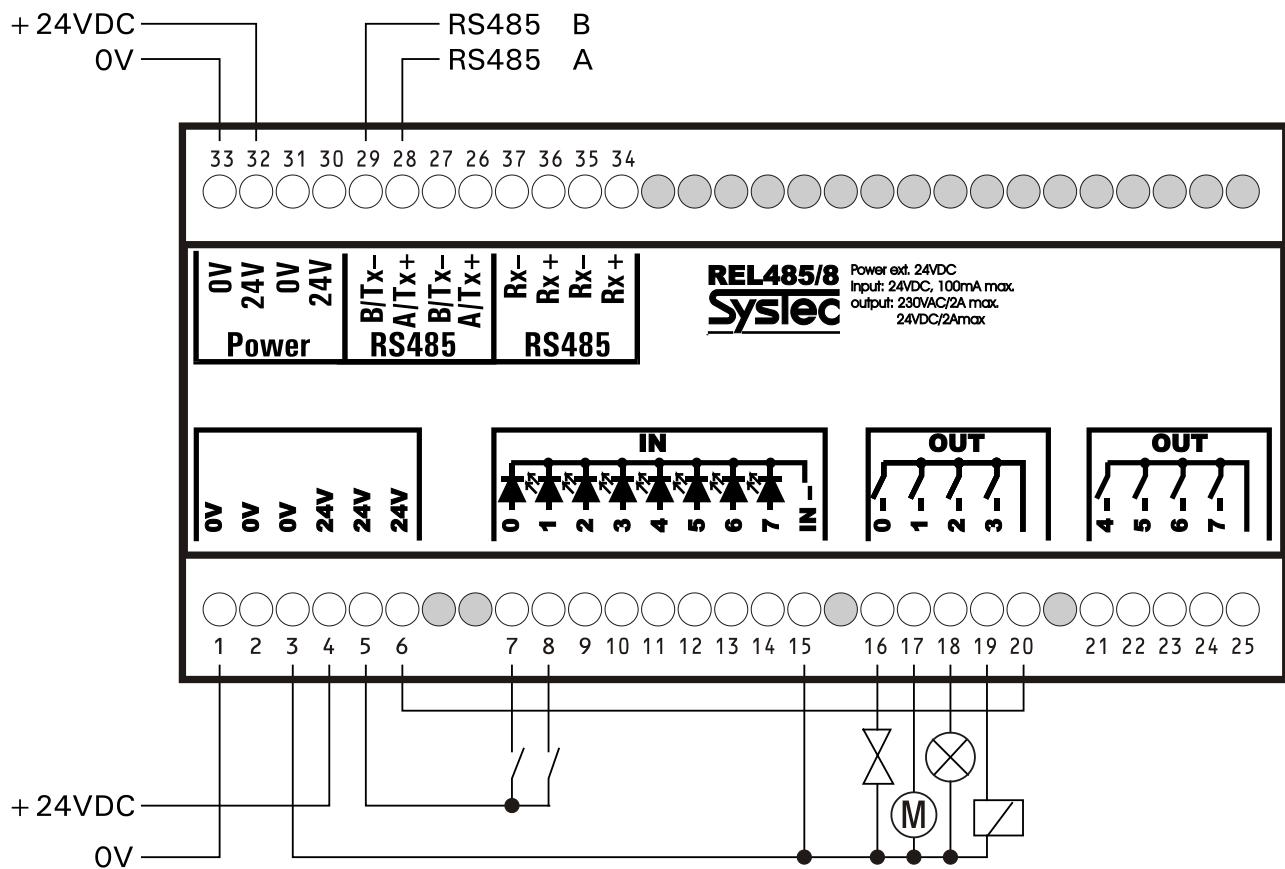
- Connect the **Inputs** (switches, push buttons, ...) to IN0 - IN7. Use only SELV voltages in compliance with EN 60950. Gauge: min. 0.25mm<sup>2</sup>. The 24VDC and 0V(24V) outputs can be used as power supply for the inputs.
- Connect the **Outputs** (valves, relays, ...) to OUT0 - OUT7. Use recovery diodes or RC circuits for all connected inductive loads. Applying 24VDC instead of 230VAC to the output relay contacts extends their life time. Optionally the 24VDC and 0V(24V) outputs can be used as power supply for the outputs.
- Connect the **RS485** network cable to terminals A and B (2-wire interface) or Tx+ /Tx-/ Rx + /Rx- (4-wire interface). Gauge: min. 0.25mm<sup>2</sup>. If an I/O unit is installed at a physical end of the RS485 network, activate pull-up, pull-down- and termination resistors by closing the corresponding jumpers.
- Connect the **cable shield** to ground potential at both cable ends. One end of the screen to be connected to the housing of the terminal via cable gland. The other end of the shield to be connected to ground at the Relay/ Transistor Unit cabinet.  
**Note:** If ground on the two ends of the cable has different potential, a separate earth link of appropriate diameter is required to avoid the shield conducting an equalization current.
- Connect **24VDC** power supply (SELV power supply unit compliant to EN 60950) at terminals 24V and 0V (top row). Power consumption: 100mA (without load on the outputs).

#### Note:

- As of index 6 of the REL485 module the terminals 'Power 24V / 0V' (at the top) are not internally connected any more to the terminals '24V / 0V' (I/Os at the bottom) and the power supply for the I/Os must be connected separately.
- Also, as of index 6, varistors (voltage dependent resistors) are connected in parallel to the relay contacts to improve noise immunity.
- As of REL485 index 007 and TRIO485 index 005 apart from the RS485 2-wire interface, also an RS485 4-wire interface is available for the connection of the TS3000 separation module.

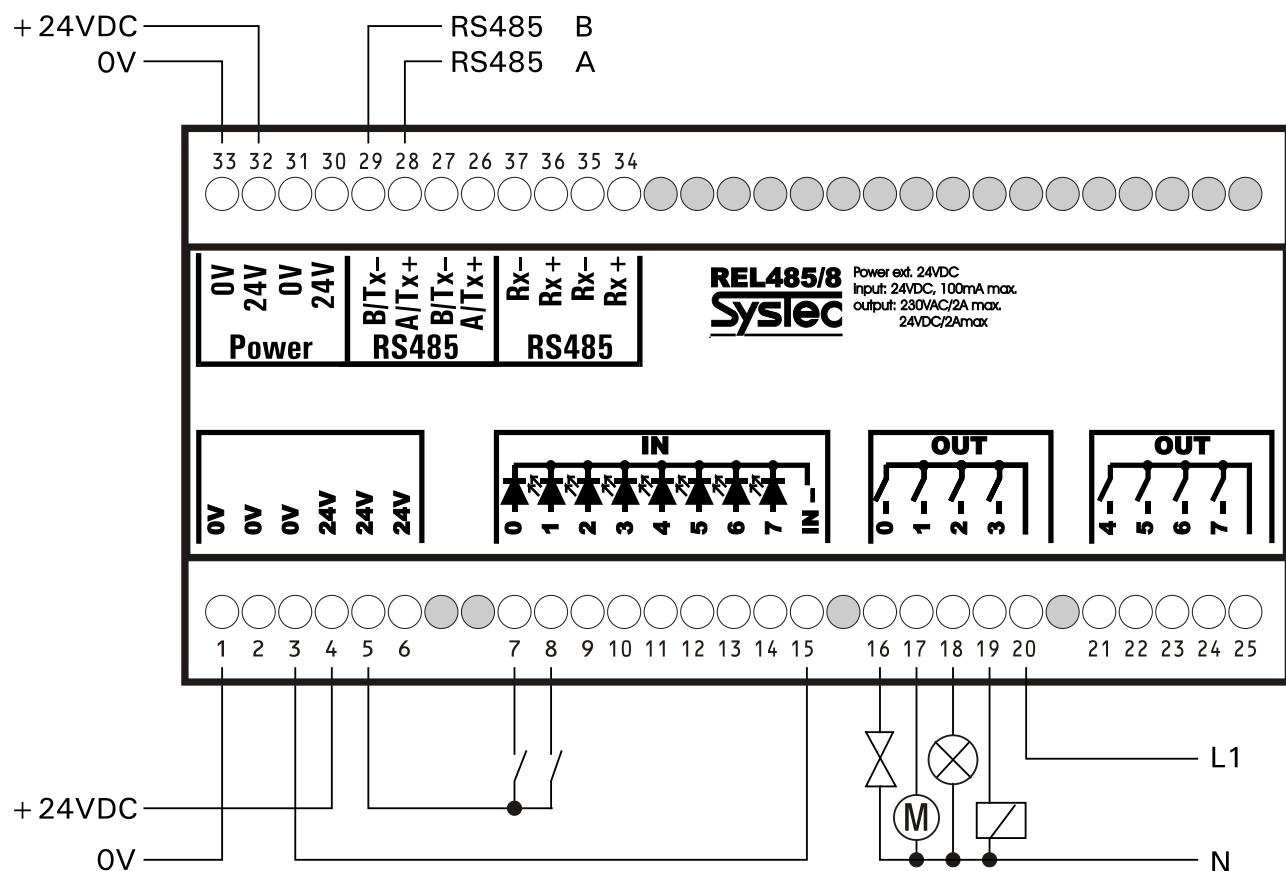
### 3.8 Wiring Schematics (Examples)

#### 3.8.1 REL485 Relay Module (Outputs Connected To 24VDC)



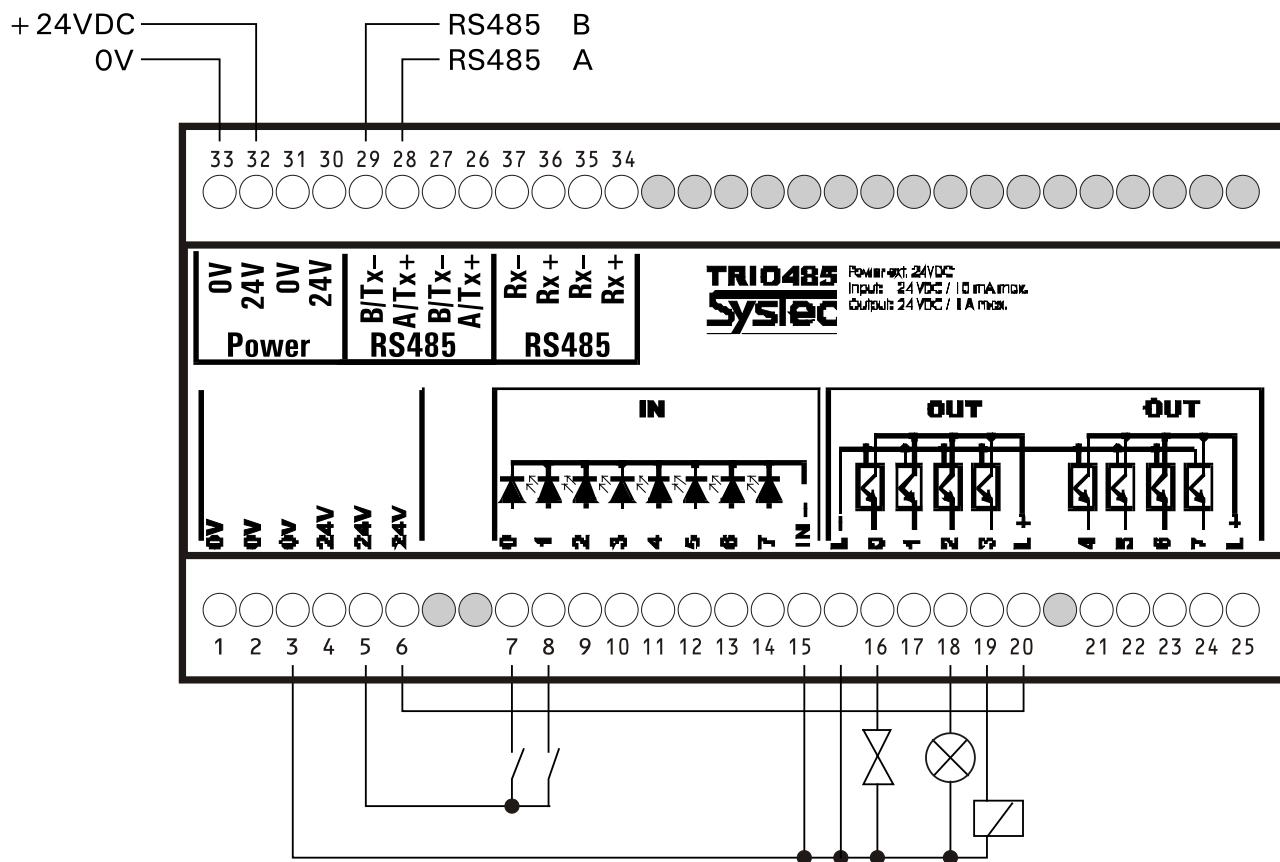
Terminal	Description
1	Power supply (I/Os) 0V
4	Power supply (I/Os) + 24VDC
28	RS485 A
29	RS485 B
32	Power supply + 24VDC
33	Power supply 0V

### 3.8.2 Relay Module (Outputs Connected To 230VAC)



Terminal	Description
1	Power supply (inputs) 0V
4	Power supply (inputs) + 24VDC
28	RS485 A
29	RS485 B
32	Power supply + 24VDC
33	Power supply 0V

### 3.8.3 TRIO485 Transistor Module



Terminal	Description
28	RS485 A
29	RS485 B
32	Power supply + 24VDC
33	Power supply 0V

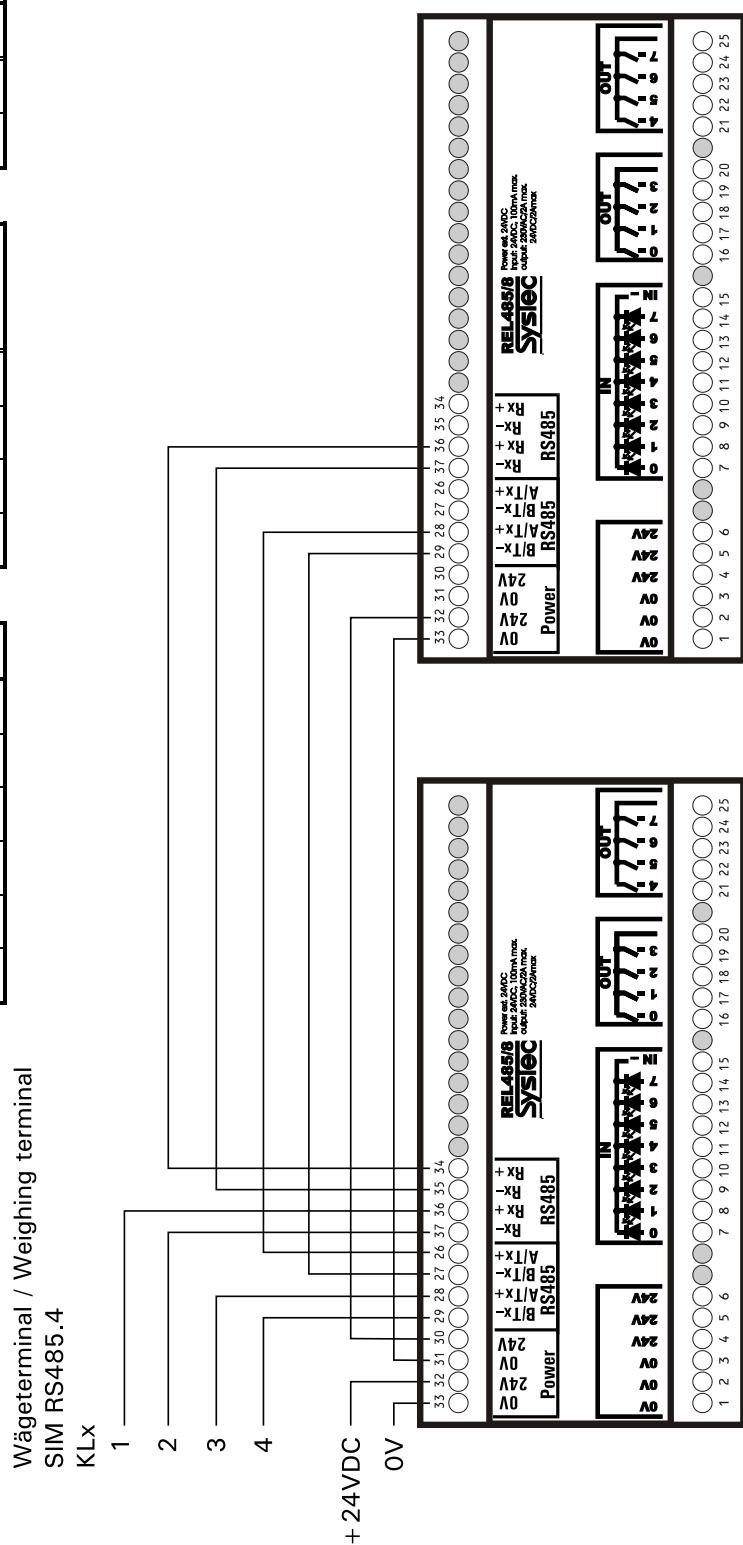
### 3.9 Wiring Schematics 4-Wire Interface For Weighing Terminal IT4000E / IT6000E / IT8000E / IT9000E

Example: RS485-4-wire connection of two relay modules to weighing terminal. It is important to activate the termination and pull-up / pull-down resistor at the last module on the bus by means of the jumpers provided. At all other modules on the bus these jumpers must remain open. For cable lengths exceeding 10m, also termination resistors of 150 W each must be installed at the screw terminals of the TS3000 between Tx+ and TX-, and also between Rx+ and Rx- in parallel to the bus cable.

1.Unit	Power supply
32	+ 24VDC
33	0V

1.Unit	Weighing terminal SIM RS485.4 KLx
29	4 (RxD-)
28	3 (RxD+ )
37	2 (TxD-)
36	1 (TxD+ )

1.Unit	2.Unit
31	33
30	32
35	37
34	36
27	29
26	28



**Note:** 1. Unit: Jumpers for termination resistors: open  
2. Unit: Jumpers for termination resistors: closed

### **3.10 Wiring Schematics 2-Wire Interface For Weighing Terminal IT6000/IT8000/IT9000**

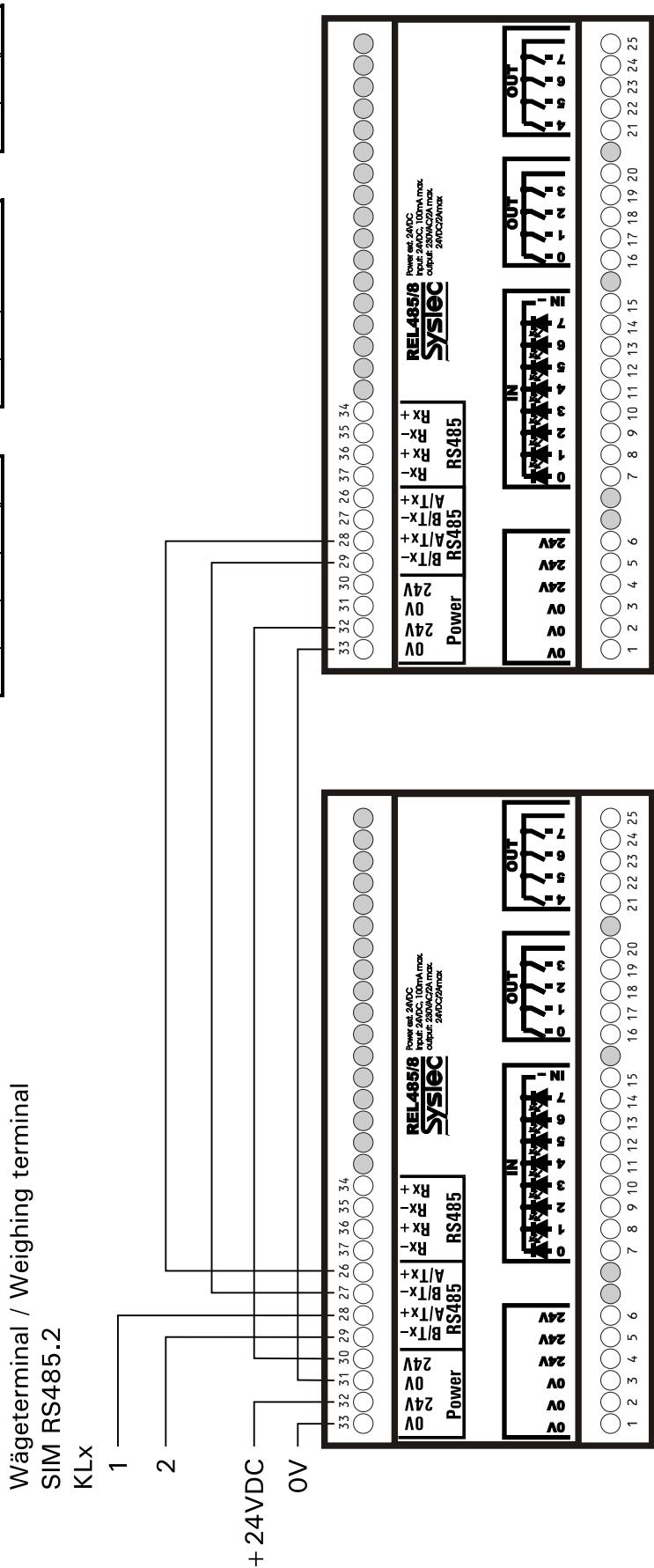
Example: IT9000 with two relay modules. Transistor modules are wired following the same principle.

It is important that the jumpers to connect pull-up-, pull-down- and termination resistors are set on the last module on the network, and that all the others are open. For a cable length <sup>3</sup> 10m, a 150 W termination resistor must also be connected at terminals A and B of the weighing terminal.

1. Unit	Power supply
32	+ 24VDC
33	0V

1. Unit	Weighing terminal SIM RS485.2 KLx
28	1 (A)
29	2 (B)

1. Unit	2. Unit
31	33
30	32
27	29
26	28



**Note:** 1. Unit: Jumpers for termination resistors: open  
2. Unit: Jumpers for termination resistors: closed

### **3.11 Wiring Schematics 4-Wire Interface For TS3000**

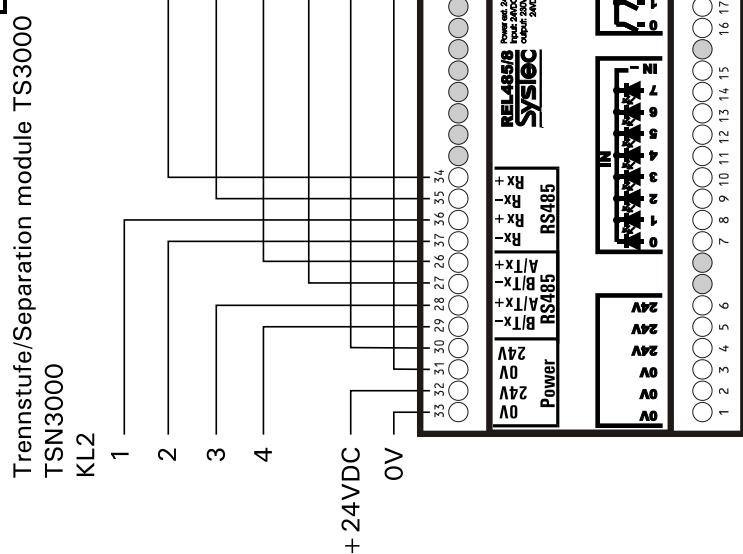
Example: RS485-4-wire connection of two relay modules to separating module TS3000. An RS485 4-wire interface must be used in the TS3000. All components must be installed in safe area.

It is important to activate the termination and pull-up / pull-down resistor at the last module on the bus by means of the jumpers provided. At all other modules on the bus these jumpers must remain open. For cable lengths exceeding 10m, also termination resistors of 150 W each must be installed at the screw terminals of the TS3000 between Tx+ and TX-, and also between Rx+ and Rx- in parallel to the bus cable.

1.Unit	Power supply
32	+ 24VDC
33	0V

1.Unit	Separation module TS3000 TSN3000 KL2
29	4 (RxD-)
28	3 (RxD+)
37	2 (TxD-)
36	1 (TxD+)

1.Unit	2.Unit
31	33
30	32
35	37
34	36
27	29
26	28



Note: 1.Unit: Jumpers for termination resistors: open  
2.Unit: Jumpers for termination resistors: closed

### 3.12 Functional Test

Please check installation before operating the relay/transistor modules. Refer to the following check list.

#### 3.12.1 Connection To Weighing Terminals IT4000E / IT8000E / IT9000E

- SIM RS485-4-wire or SIM-RS485-OPTO installed in socket SIM1 or SIM2 (in IT9000E also SIM3)?
- In Service Mode group 'Configuration IO' option 'REL/TRIO' chosen and the corresponding interface 'SIM1', 'SIM2' or 'SIM3' (only IT9000E) selected?
- Are the parameters for the DeviceBus of the COM interface used for RS485 communication set in the Service Mode to 19200 baud, 8 data bits, odd parity?
- Pull-up resistors installed at all physical ends of the RS485 network?
- Addresses of the Relay/Transistor Units set in rising order, starting with 0?
- Wiring of RS485.4 interface correct?
- For REL485 (Index 6 and higher): separate power supply connected for inputs and outputs?

If your answer to all questions of the check list is Yes and it has been made sure that the installation was carried out in strict compliance with all applicable local safety regulations and the rules for prevention of accidents, you can start the test.

When the weighing terminal and the I/O-Unit(s) are switched on, the LED 'Ready' indicates that the communication between terminal and I/O unit is running.

In Service Mode, group 'Test' choose option 'Parallel IO'. Here the relay/transistor modules 1 to 8 can be tested one after the other. The state of the inputs and outputs is shown. Outputs can be set / reset with the numeric keys 0 to 7.



#### W A R N I N G

Exercise utmost care when setting outputs that control conveyors or feeders or any other moving parts. Make sure that all personnel is out of reach of any moving parts. Failure to observe this precaution could result in bodily injury!

### 3.12.2 Connection To IT6000 / IT8000 / IT9000 Weighing Terminals

- SIM-RS485 2-wire or SIM-RS485-OPTO mounted as SIM1 or SIM2 (IT9000), SIM RS485 mounted as SIM1 to SIM3 (IT8000), or slide switch in RS485 position (IT6000)?
- IT9000 jumpers for SIM1 or SIM2 in middle position?
- IT9000: COM1 or COM2 (IT8000: COM1 to COM3) in Service Mode set to: 19200 Baud, 8O, HDX, Ext.Bus, I/O-Module, DeviceBus?
- Pull-up resistors installed at all physical ends of the RS485 network?
- Addresses of the Relay/Transistor Units set in rising order, starting with 0?
- Wiring of RS485.2 interface correct?
- For REL485 (Index 6 and higher): separate power supply connected for inputs and outputs?

If your answer to all questions of the check list is Yes and it has been made sure that the installation was carried out in strict compliance with all applicable local safety regulations and the rules for prevention of accidents, you can start the test.

When the weighing terminal and the I/O-Unit(s) are switched on, the LED 'Ready' indicates that the communication between terminal and I/O-Unit is running.

Select Service Mode, group 6 (Hardware Test), Test 2 (Test Inputs / Outputs). The Relay/Transistor Modules 1...8 are selected by pressing the function keys F1...F8. The status of all inputs and outputs of the selected I/O unit is displayed. The outputs can be switched on or off by pressing the keys 1...8 (e.g. press 1 once to switch the first output on, press 1 again to switch it off).



#### W A R N I N G

Exercise utmost care when setting outputs that control conveyors or feeders or any other moving parts. Make sure that all personnel is out of reach of any moving parts. Failure to observe this precaution could result in bodily injury!

### 3.12.3 Connection To Separation Module TS3000

- TS3000 fitted with RS485.4 interface?
- Termination resistors installed at all physical ends of the RS485 network?
- Addresses of the Relay/Transistor Units set in rising order, starting with 0?
- Wiring of RS485.4 interface correct?
- For REL485 (Index 6 and higher): separate power supply connected for inputs and outputs?
- Separating Module TS3000 and relay/transistor modules installed in safe area?
- All safety advices adhered to for separating module TS3000 and the connected weighing terminal IT3000Ex / IT8000Ex?
- No potentially explosive atmosphere present?

If your answer to all questions of the check list is Yes and it has been made sure that the installation was carried out in strict compliance with all applicable local safety regulations and the rules for prevention of accidents, you can start the test.



#### W A R N I N G

Exercise utmost care when setting outputs that control conveyors or feeders or any other moving parts. Make sure that all personnel is out of reach of any moving parts. Failure to observe this precaution could result in bodily injury!

### 3.13 Address Of Inputs/Outputs

If the SINEC L2 protocol is selected in the Service Mode of the weighing terminal, the addresses of the relay/transistor unit inputs and outputs range from 0 to 63.

IT9000 only: by selecting SINEC L2 protocol, the inputs and outputs of the IT9000 CPU and IFU are shifted to 64 to 79.

### 3.14 Errors

In the case of a transmission error between weighing terminal and I/O module, the outputs of all relay/transistor units are reset after a timeout of 1 second. The LED 'Ready' is switched off. The terminal display shows the error message 'I/O Error'.

## 4 Terminal Assignment

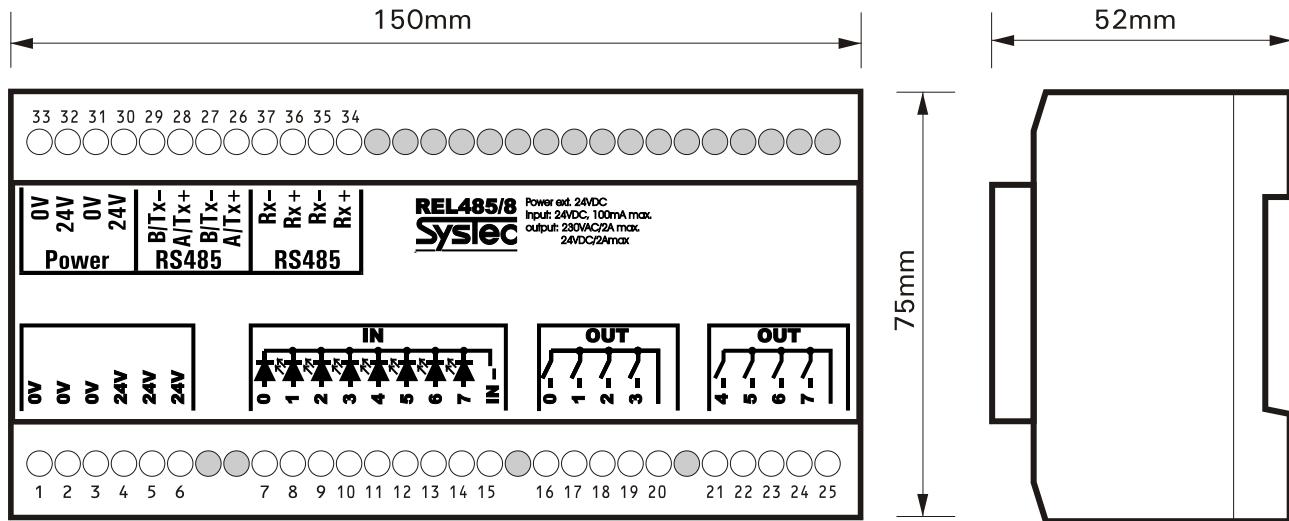
### Power Supply and RS485 Interface

Terminal	Assignment
Power OV	Power supply; 0V(24VDC)
Power 24V	Power supply; + 24VDC
A	RS485 2-wire interface: TX+ / RX+
B	RS485 2-wire interface: TX- / RX-
Tx+	RS485 4-wire interface: positive transmit line
Tx-	RS485 4-wire interface: negative transmit line
Rx+	RS485 4-wire interface: positive receive line
Rx-	RS485 4-wire interface: negative receive line

### Sample for I/O assignment

Inputs IN0 - IN7		Outputs OUT0 - OUT7	
Terminal	Assignment	Terminal	Assignment
IN0		OUT0	
IN1		OUT1	
IN2		OUT2	
IN3		OUT3	
IN4		OUT4	
IN5		OUT5	
IN6		OUT6	
IN7		OUT7	
IN-	Common potential (0V) for IN0 - IN7	OUT-	Common potential (0V) for OUT0 - OUT7

## 5 Dimensions



Dimensions indicated apply to both units, REL485 relay module and TRIO485 transistor module.

# DAM

Digital Analog Module  
with 15-bit resolution

ST.1100.0018

13th March, 2017

Rev. 1.1

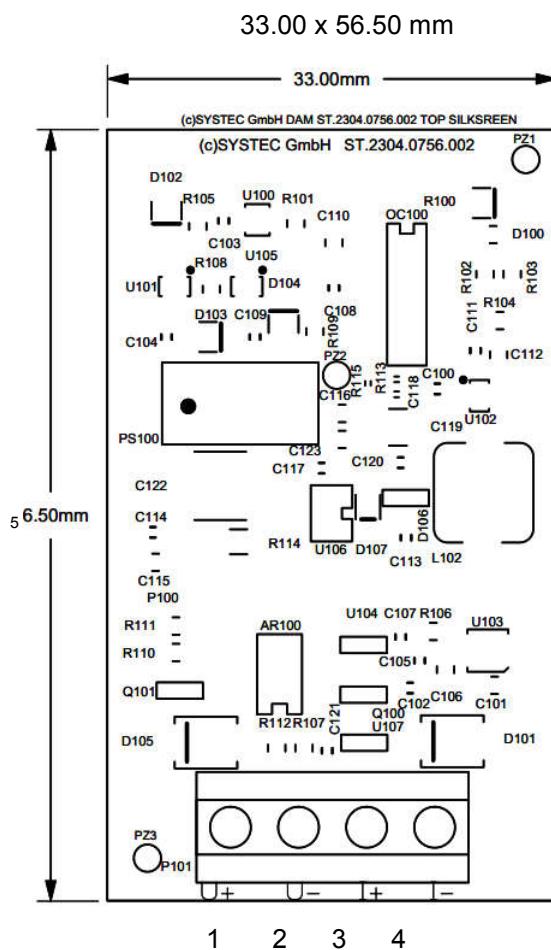


# 1 Module Description

## 1.1 General

The DAM is an analog module with voltage and current output. It must be installed on the ADM2 socket. The DAC output has a 15-bit resolution which is driven directly by the operating system / scale task within the high speed real time bus.

## 1.2 Dimensions



## 1.3 Terminal Connector

P101	Signal
1 (U+)	(+) 0-10VDC / 2-10VDC
2 (U-)	(-) 0-10VDC / 2-10VDC
3 (I+)	(+) 0-20mA / 4-20mA
4 (I-)	(-) 0-20mA / 4-20mA

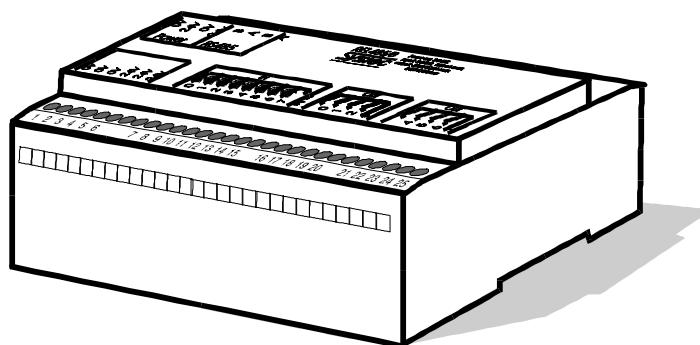
**Note:** Both analog outputs are active

## 2 Electrical Specifications

<b>Power Consumption</b>	max. 0.6W (120mA @ 5V)
<b>Analog Resolution</b>	15-bit
<b>Outputs</b>	Active
	0-10VDC / 2-10VDC
	0-20mA / 4-20mA
<b>Potential Isolation</b>	Optically
<b>Tolerance</b>	Adjustable
<b>Voltage Output Load</b>	min. 500 Ohm , <u>NOT</u> short-circuit proof
<b>Current Output Load</b>	max. 500 Ohm
<b>Temperature Stability</b>	<0,002% / K

## Installation Instructions

# MAI



Analog I/O Module

April 2016

ST.2309.0188

Rev. 5



## **Installation Instructions Analog I/O Module MAI**

Date: April 21, 2016

File: MAI\_IAE.DOC

**Published By:**

© SysTec Systemtechnik und Industrieautomation GmbH, Bergheim, Germany

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, mechanical, photocopying, recording, or otherwise, without the prior written permission of SysTec GmbH.

Terms and product names mentioned in this publication are trademarks, registered trademarks or service marks of their respective owners. Use of a term should not be regarded as affecting the validity of any trademark, registered trademark or service mark.

**Please Note:**

While every precaution has been taken in the preparation of this manual, SysTec GmbH assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein.

The publisher is grateful for any information and/or advice that may contribute to correct errors or omissions in following editions.

## Contents

<b>1 General.....</b>	<b>7</b>
<b>2 Terminal Assignment.....</b>	<b>10</b>
<b>3 Settings.....</b>	<b>11</b>
3.1 Bus Termination Serial Interface RS485.....	11
3.1.1 Termination Of RS485 Signals A/Tx + And B/Tx- .....	11
3.1.2 Termination Of RS485 Signals Rx + And Rx- .....	11
3.2 Address Setting (S1 Rotary Switch), (W4 Jumper Address Range).....	12
3.3 Interface Setting Weighing Terminal ITx000.....	12
<b>4 Wiring Examples .....</b>	<b>13</b>
4.1 2-Wire Connection To Weighing Terminal ITx000 .....	13
4.2 4-Wire Connection To Separation Module TS3000.....	14
4.3 Connection to Analog Output Board (DAE).....	15
4.4 Connection to Analog Input Board (ADE) .....	17
4.5 Electrical Characteristics.....	19
<b>5 Declaration Of Conformity EU (only valid until April 19, 2016).....</b>	<b>20</b>
<b>6 Dimensions .....</b>	<b>21</b>



## 1 General

The modular analog interface (MAI) provides interfacing for up to 4 analog inputs and/or outputs as option for ITx000 weighing terminals. As of MAI module index 004, also the interface separation module TS3000 can be connected. The basic module has four slots that can be fitted as required (also mixed) with input (ADE) and/or output (DAE) interface boards. The module is controlled from the weighing terminal via a 2-wire RS485 interface. Connection to the separation module TS3000 is made via a 4-wire RS485 interface.

The input and output voltages of the individual modules are isolated from each other and from the voltages of the weighing terminal. The I/Os can be configured for 0 – 10V or 0/4 – 20mA. The required power supply for the I/Os must be provided externally.

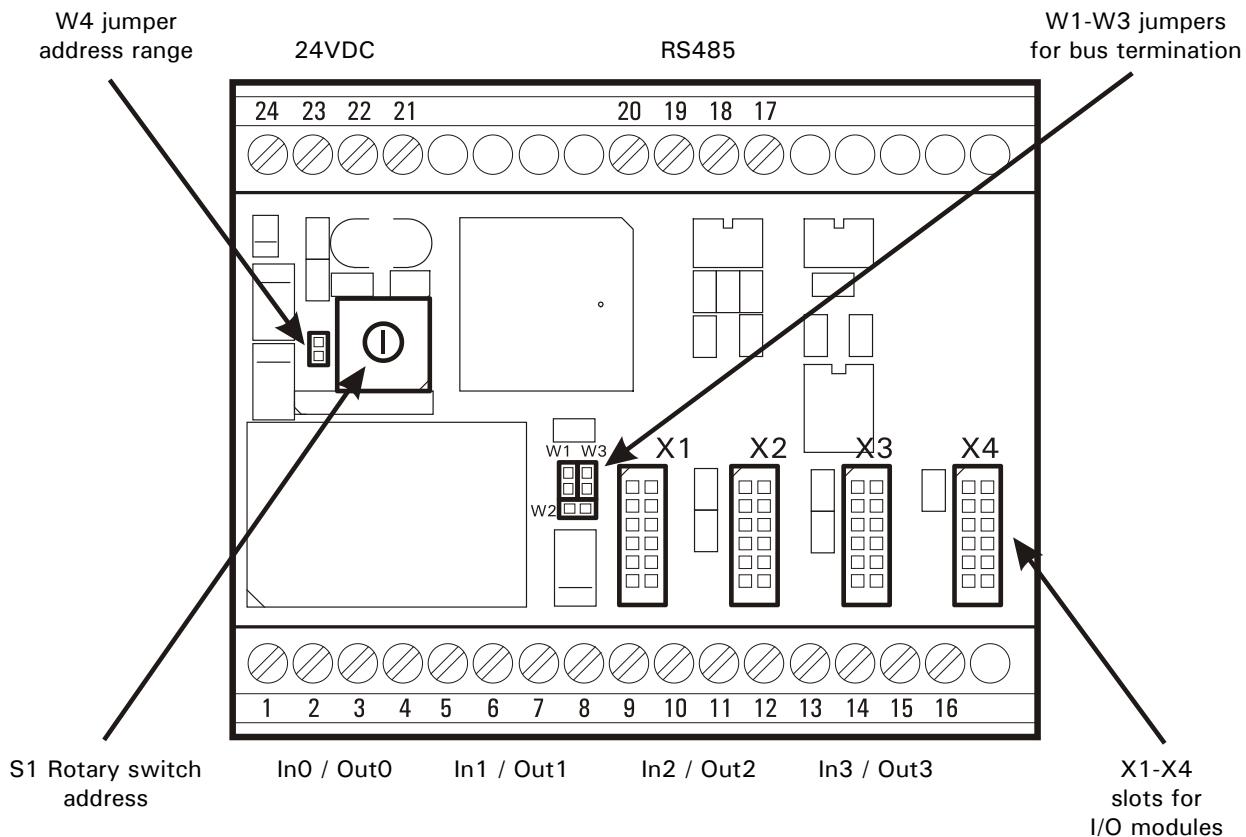
The analog interface can be used on the same RS485 bus as relay or transistor modules for digital signals (firmware 2.0 or higher). The address can be set via a rotary switch, the extension of the address range is possible by means of a jumper. If the analog interface is the last device at the physical end of the bus, the bus lines must be terminated via jumpers.

The MAI module is incorporated in a standard plastic housing for installation on DIN rail.

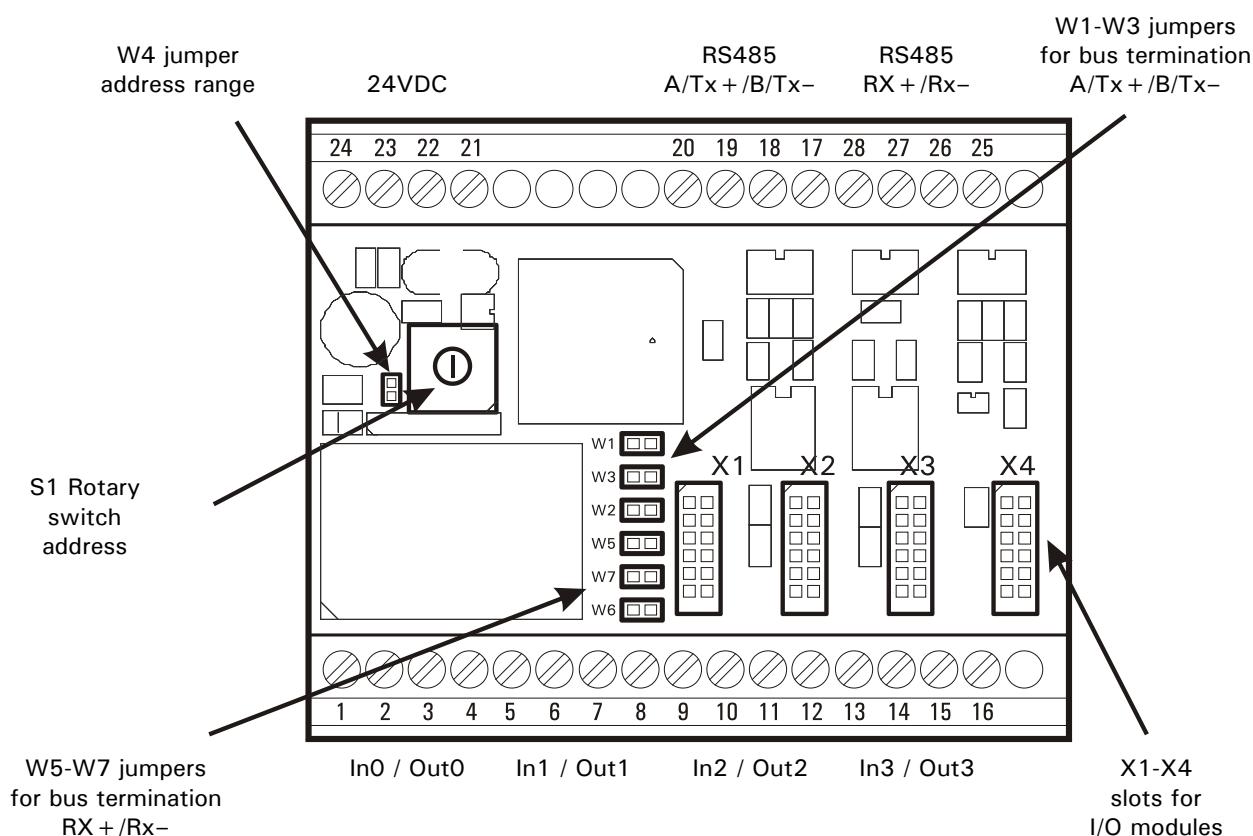
### **! ATTENTION**

- The MAI module must not be installed in hazardous area, it may only be installed in safe area. When it is connected to the separation module TS3000, it must be made absolutely sure that the Technical Manual TS3000 is observed!**

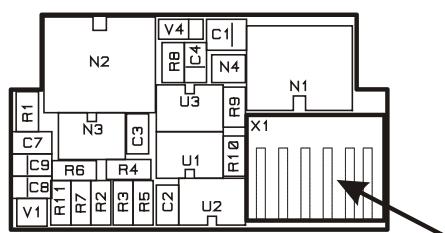
### MAI Basic Module index 003 or lower (RS485 2-wire interface only)



## MAI Basic Module index 004 or higher (RS485 2-wire and 4-wire interface)

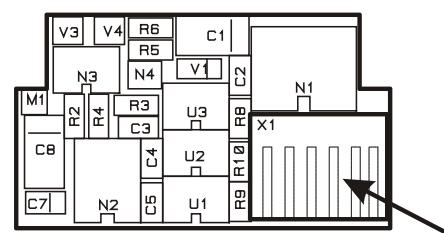


Analog input board (ADE)



X1 connector to  
basic module

Analog output board (DAE)



X1 connector to  
basic module

## 2 Terminal Assignment

Terminal	Assignment	Function	Internally
1	(+) 0-20mA	Input or output 0	KL3
2	(-) 0-20mA	Input or output 0	
3	(+) 0-10V	Input or output 0	
4	(-) 0-10V	Input or output 0	
5	(+) 0-20mA	Input or output 1	KL4
6	(-) 0-20mA	Input or output 1	
7	(+) 0-10V	Input or output 1	
8	(-) 0-10V	Input or output 1	
9	(+) 0-20mA	Input or output 2	KL5
10	(-) 0-20mA	Input or output 2	
11	(+) 0-10V	Input or output 2	
12	(-) 0-10V	Input or output 2	
13	(+) 0-20mA	Input or output 3	KL6
14	(-) 0-20mA	Input or output 3	
15	(+) 0-10V	Input or output 3	
16	(-) 0-10V	Input or output 3	
17	A/Tx +	RS485 2-wire: send/receive signal A RS485 4-wire: send signal Tx +	KL2
18	B/Tx –	RS485 2-wire: send/receive signal B RS485 4-wire: send signal Tx –	
19	A/Tx +	RS485 2-wire: send/receive signal A RS485 4-wire: send signal Tx +	
20	B/Tx –	RS485 2-wire: send/receive signal B RS485 4-wire: send signal Tx –	
21	0V	Power supply 24V	KL1
22	0V	Power supply 24V	
23	+ 24VDC	Power supply 24V	
24	+ 24VDC	Power supply 24V	
25	Rx +	RS485 4-wire: receive signal Rx +	KL7
26	Rx –	RS485 4-wire: receive signal Rx –	
27	Rx +	RS485 4-wire: receive signal Rx +	
28	Rx –	RS485 4-wire: receive signal Rx –	

### 3 Settings

#### 3.1 Bus Termination Serial Interface RS485

##### 3.1.1 Termination Of RS485 Signals A/Tx + And B/Tx-

Jumper	State	Function
W1	open closed	Pullup resistor 100KΩ Pullup resistor 390Ω
W2	open closed	Pullup resistor 100KΩ Pullup resistor 390Ω
W3	open closed	Bus termination open Bus termination resistor 220Ω

The bus is terminated when the jumpers W1 – W3 are closed.

##### 3.1.2 Termination Of RS485 Signals Rx + And Rx-

Jumper	State	Function
W5	open closed	Pullup resistor 100KΩ Pullup resistor 390Ω
W6	open closed	Pullup resistor 100KΩ Pullup resistor 390Ω
W7	open closed	Bus termination open Bus termination resistor 220Ω

The bus is terminated when the jumpers W5 - W7 are closed.

### 3.2 Address Setting (S1 Rotary Switch), (W4 Jumper Address Range)

Jumper W4	Switch S1 Position	Address
open 	0	0
	1	1
	2	2
	3	3
	4	4
	5	5
	6	6
	7	7
	8	8
	9	9
closed 	0	16
	1	17
	2	18
	3	19
	4	20
	5	21
	6	22
	7	23
	8	24
	9	25

### 3.3 Interface Setting Weighing Terminal ITx000

The parameters of the weighing terminal's serial channel that connects to the MAI module must be set to:

Baudrate: 19200

Data Format: 8O (8 bit, odd parity)

Handshake: HDX

Protocol: Ext.Bus

I/O-Modules: enter only number of *parallel* I/O modules on the bus

SinecL2 / DeviceBus: DeviceBus

**Note:** Connection of MAI analog interface modules requires version RTP 4.09 or later of the operating system.

## 4 Wiring Examples

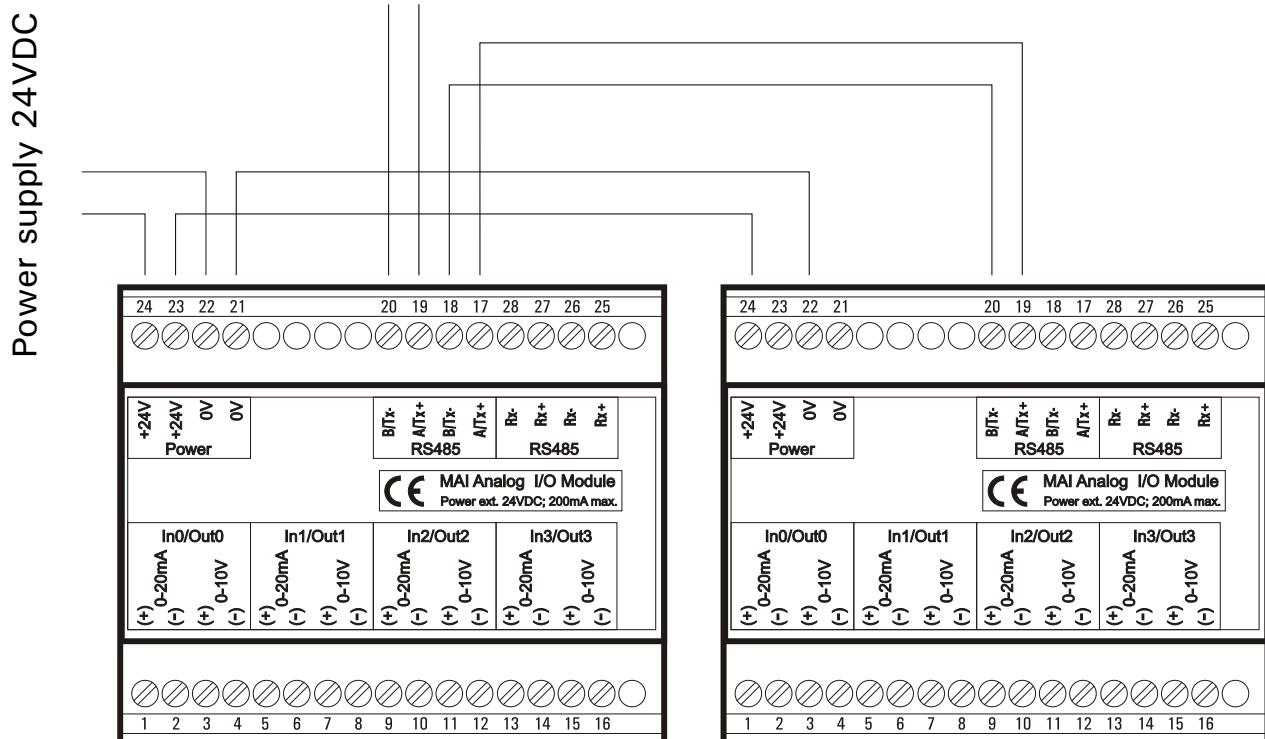
### 4.1 2-Wire Connection To Weighing Terminal ITx000

Example: RS485 2-wire connection of 2 MAI modules to weighing terminal IT9000.

Note! It is important that the jumpers for pull-up, pull-down and termination resistors are closed at the last module at the physical end of the bus, and that they are open at all other modules.

Cable lengths exceeding 10m also require the installation of a  $150\Omega$  termination resistor between A and B line of the RS485 interface in parallel to the wires at the screw terminals of the weighing terminal.

IT9000 SIM RS485 2-wire



Jumpers for termination resistors

open

closed

## 4.2 4-Wire Connection To Separation Module TS3000

Example: RS485 4-wire connection of 2 MAI modules to separation module TS3000, requires a TS3000 separation module with RS485.4 interface. All components must only be installed in non-hazardous (safe) area.

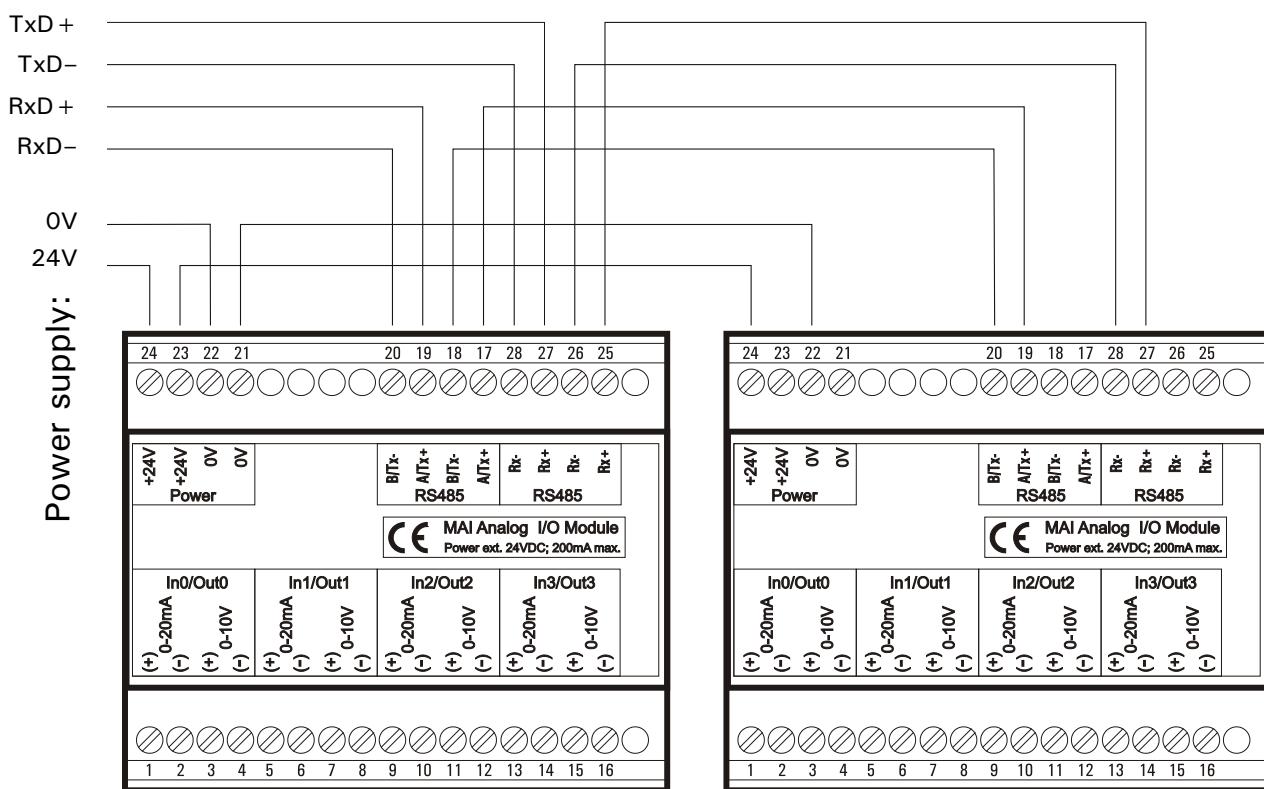
Note! It is important that the jumpers for pull-up, pull-down and termination resistors are closed at the last module at the physical end of the bus, and that they are open at all other modules.

Cable lengths exceeding 10m also require the installation of two  $150\Omega$  termination resistors between Tx+ and Tx-, and between Rx+ and Rx- in parallel to the wires at the screw terminals of the separation module.

### ATTENTION

- The MAI module must not be installed in hazardous area, it may only be installed in safe area. When it is connected to the separation module TS3000, it must be made absolutely sure that the Technical Manual TS3000 is observed!

Separation  
module  
TS3000:



Jumpers for termination resistors

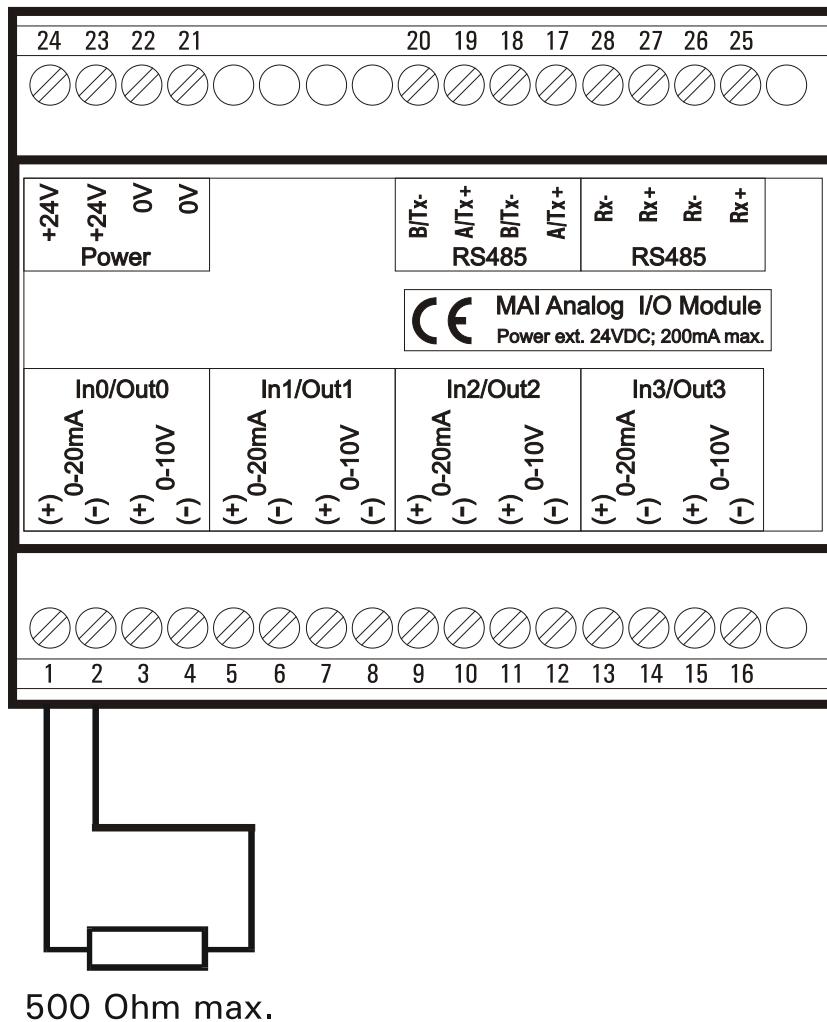
open

closed

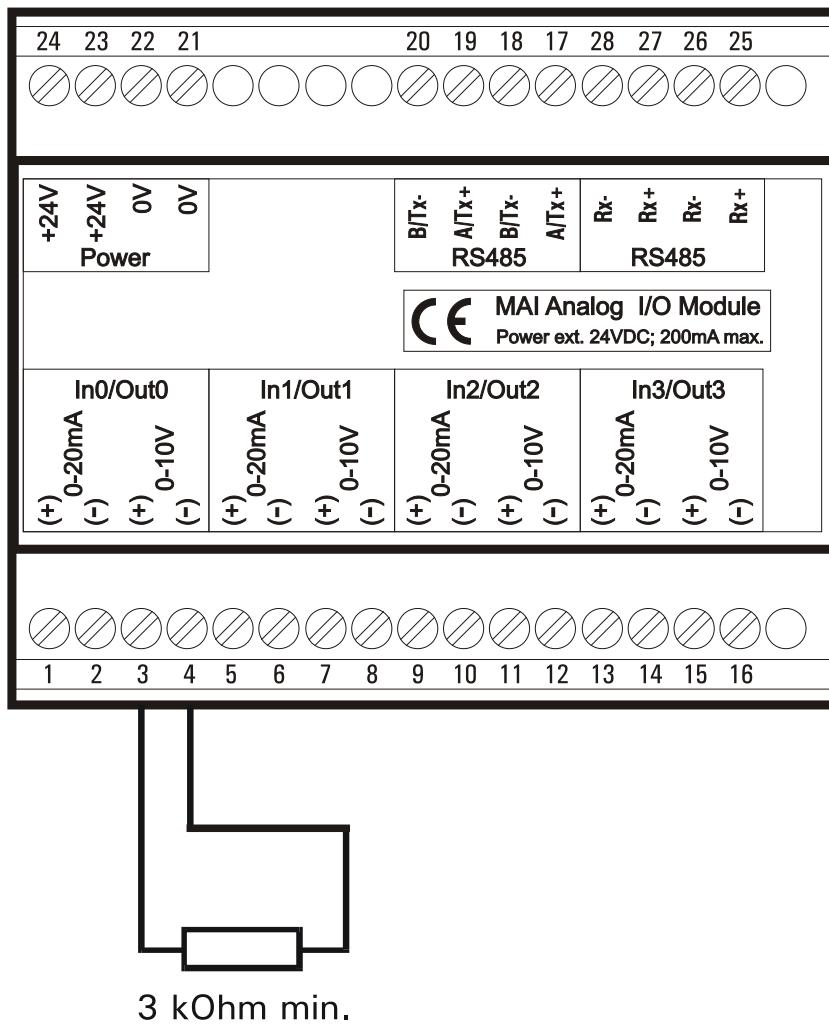
#### 4.3 Connection to Analog Output Board (DAE)

For the output of gross or net weight as analog signal up to 4 Analog Output Boards DAE can be inserted in MAI slots X1 – X4 . The output signals are active and floating and have a resolution of 12 bits (4096 steps). Each DAE provides voltage output 0/2 - 10V (load > 3kOhm) or current output 0/4 - 20mA (load < 500 Ohm).

Connection example of DAE current output 0/4 - 20mA  
(DAE inserted in MAI slot X1):



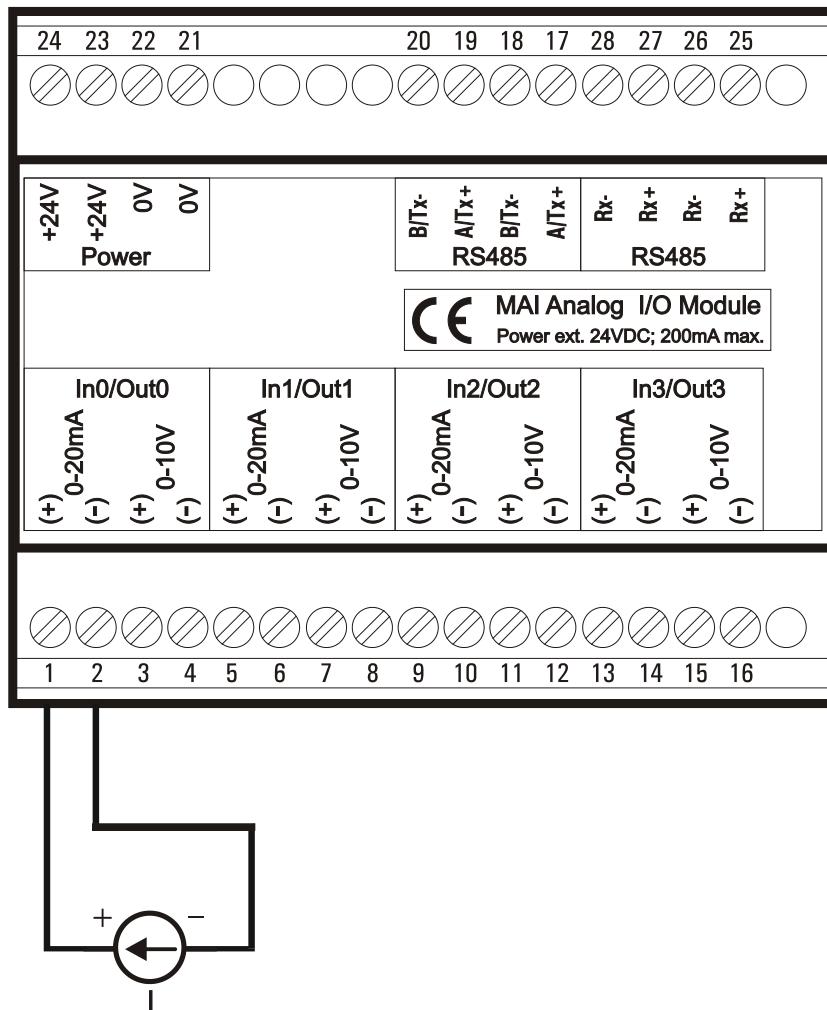
Connection example of DAE voltage output 0/2 – 10V  
 (DAE inserted in MAI slot X1):



#### 4.4 Connection to Analog Input Board (ADE)

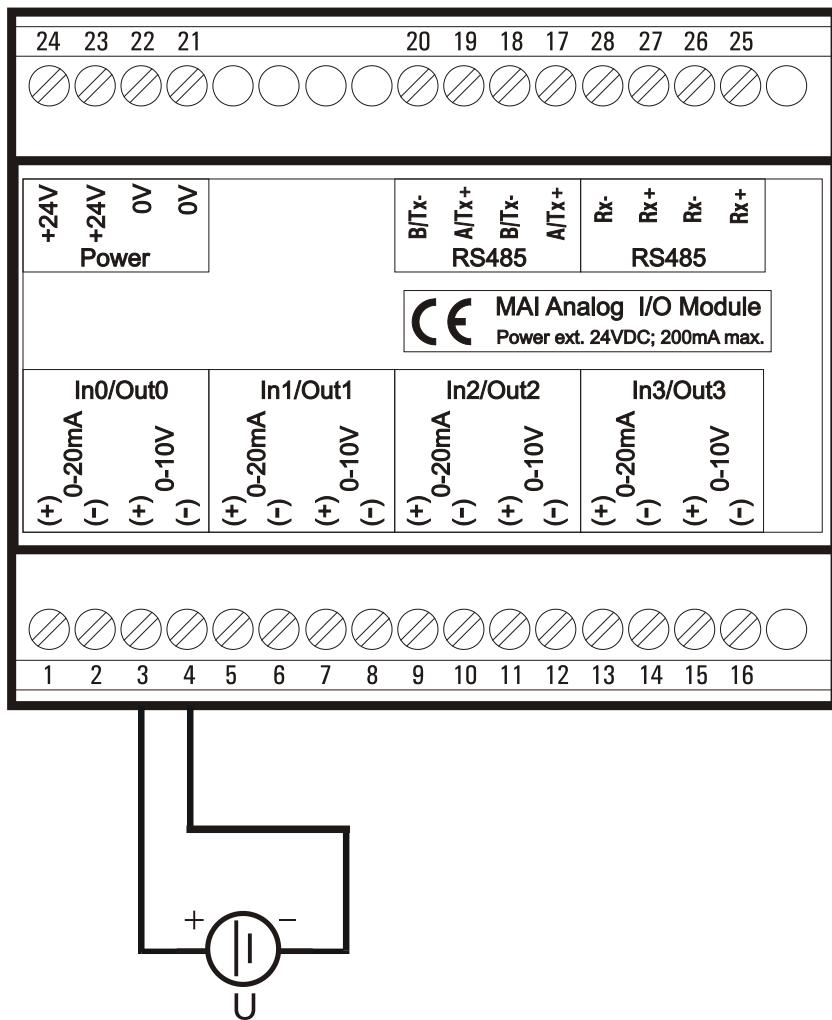
For the measurement of analog voltages or currents the Analog Input Board ADE can be inserted in MAI slots X1-X4. The input signal has a resolution of 12 bit (4096 steps). The input of the ADE board is passive and floating. It provides current input 0/4-20mA (impedance 24 Ohm) or voltage input 0-10V (impedance 105kOhm).

Connection example of ADE current input 0/4 - 20mA  
(ADE inserted in MAI slot X1):



ADE input impedance  $R_i = 24 \text{ Ohm}$

Connection example of ADE voltage input 0 – 10V  
(ADE inserted in MAI slot X1):



ADE input impedance  $R_i = 105 \text{ k}\Omega$

## 4.5 Electrical Characteristics

<b>Supply voltage:</b>	
Nominal value:	24VDC
Permissible range:	19.5...30VDC
Current consumption:	depending on number of I/Os, 200mA max.
<b>Analog inputs:</b>	
Number:	4 max.
Potential separation:	yes, optoisolated inputs
Eingang:	0 - 10 V or 0/4 - 20 mA
Resolution:	12 Bit
Limits of operating error:	± 0.6%
Impedance (U):	105 kΩ
Impedance (I):	24 Ω
<b>Analog outputs:</b>	
Number:	4 max.
Potential separation:	yes, optoisolated outputs
Output:	0 - 10 V or 0/4 - 20 mA
Resolution:	12 Bit
Limits of operating error:	+ / - 0.6%
Load voltage output:	> 3 kΩ
Load current output:	< 500 Ω
<b>Serial interface:</b>	
Hardware:	RS485 2-wire bus
	RS485 4-wire, multidrop as of index 004
Baud rate:	19200 baud (Modbus protocol)
Bus termination:	jumper W1-3 and W5-7
<b>Microcontroller 87C51:</b>	
EPROM:	4 KByte
RAM:	128 Byte
Frequency:	11,0592 MHz
<b>Addressing:</b>	
Rotary switch:	S1
Range select jumper:	W4
Address range:	0 - 9, 16 - 25
Dimensions PCB:	88.0 x 71.8 mm

## 5 Declaration Of Conformity EU (only valid until April 19, 2016)

SysTec Systemtechnik und Industrieautomation GmbH  
 Ludwig-Erhard-Str. 6  
 D-50129 Bergheim-Glessen



### Konformitätserklärung *Declaration of conformity* *Déclaration de conformité*

**Das Relais- / Transistormodul**

*The relay / transistor module*

Le couplage de relais / transisteurs

Hersteller: <i>Manufacturer:</i> Fabricant:	SysTec GmbH
Typ/Modell: <i>Type/Model:</i> Type/modèle:	MAI

**entspricht den Anforderungen der folgenden Richtlinien:**

*corresponds to the requirements of the following EC directives:*

*correspond aux exigences des directives CE suivantes:*

2004/108/EG 2006/95/EG	2004/108/EC 2006/95/EC	2004/108/CE 2006/95/CE
---------------------------	---------------------------	---------------------------

**entsprechend den folgenden Normen/Empfehlungen:**

*in conformity with the following standards:*

*conforme aux normes suivantes:*

EN 61000-6-4:2007 EN 60950-1:2006	EN 61000-6-2:2005
--------------------------------------	-------------------

**Unterschrift**

*Signature*

Signature

**Datum:**

**24.02.2011**

*Date:*

*February 24, 2011*

*Date:*

**24.02.2011**

Dipl.-Ing. Rainer Junglas

Geschäftsführer / General Manager / Directeur

## 6 Dimensions

Standard plastic housing for installation on DIN rail

