



ACF ACTIVE CONTACT FLANGE

User Manual

EN

FERROBOTICS
perfect feeling



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1 General

1.1 Contact details

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Subject to changes.

1.2 Introduction

Purpose of the document

This document describes the commissioning and operation of the ACF.

Pre-requisites







This document is aimed at start-up engineers with technical training (higher education, training as an engineer or relevant professional experience) and at least knowledge of the following:

Safety regulations

- Safety instructions
- The operational method of the machinery or system in which the ACF will be used.
- Basic functions of the application
- System analysis and troubleshooting
- The setting of options on the operating devices

Representation

In this Manual you will find indications and warnings of possible dangers at various points. The symbols used in this Manual have the following meanings:



	DANGER! Means that death or serious bodily injury will occur if the relevant precautionary measures are not complied with.
	WARNING! Means that death or serious bodily injury may occur if the relevant precautionary measures are not complied with.
	CAUTION! Means that material damage or slight bodily injury may occur if the relevant precautionary measures are not complied with.
	ATTENTION Means that material damage may occur if the relevant precautionary measures are not complied with.
	This warning makes reference to the possible consequences of touching electrostatically sensitive components.
	Information Tips for use and useful information are marked as "Information". They do not contain any information which warns of a dangerous or hazardous function.

Information in this document

This Manual is part of the product. It must be retained for the duration of the product's lifespan and passed on to subsequent owners or users, if any, of the product.

1.3 General Safety Information for Personal Safety

SEE CHAPTER 5 IN PARTICULAR: Regarding Safety

	<p>WARNING!</p> <p>It is obligatory to comply with the safety information in the system manual for the automation system in which your ACF is used.</p> <p>Personal exposure to hazards due to mechanical forces</p> <ul style="list-style-type: none"> • Thrust or traction of several 100 N can be exerted, dependent on the design of the ACF. Further information can be obtained from the technical data in this Manual. <p>Personal exposure to hazards due to electric shock</p> <ul style="list-style-type: none"> • Only supply the power-on box with safety extra-low voltage (e.g. SELV or PELV in accordance with EN 61131-2:2007) • Only connect potentials and circuits to connections, terminals or interfaces up to 50 V nominal voltage which have safe insulation at dangerous voltages (e.g. via adequate insulation and dielectric strength). • Keep the Control Box closed when running <p>Personal exposure to hazards due to compressed air</p> <ul style="list-style-type: none"> • Only supply the ACF with compressed air as specified in the commissioning instructions. • Ensure that the compressed air supply is switched off before connecting or disconnecting compressed air piping.
	<p>CAUTION!</p> <p>Fire risk in the event of component failure</p> <ul style="list-style-type: none"> • In the end application, ensure adequate fusing of the 24 V DC electricity supply. Only fuses with maximum 4 A nominal breaking current may be used.

1.4 Output and equipment description, technical data

Purpose of the equipment

The ACF is intended for the exertion of regulated pressure and traction in automation systems.

Components and system integration of standard design

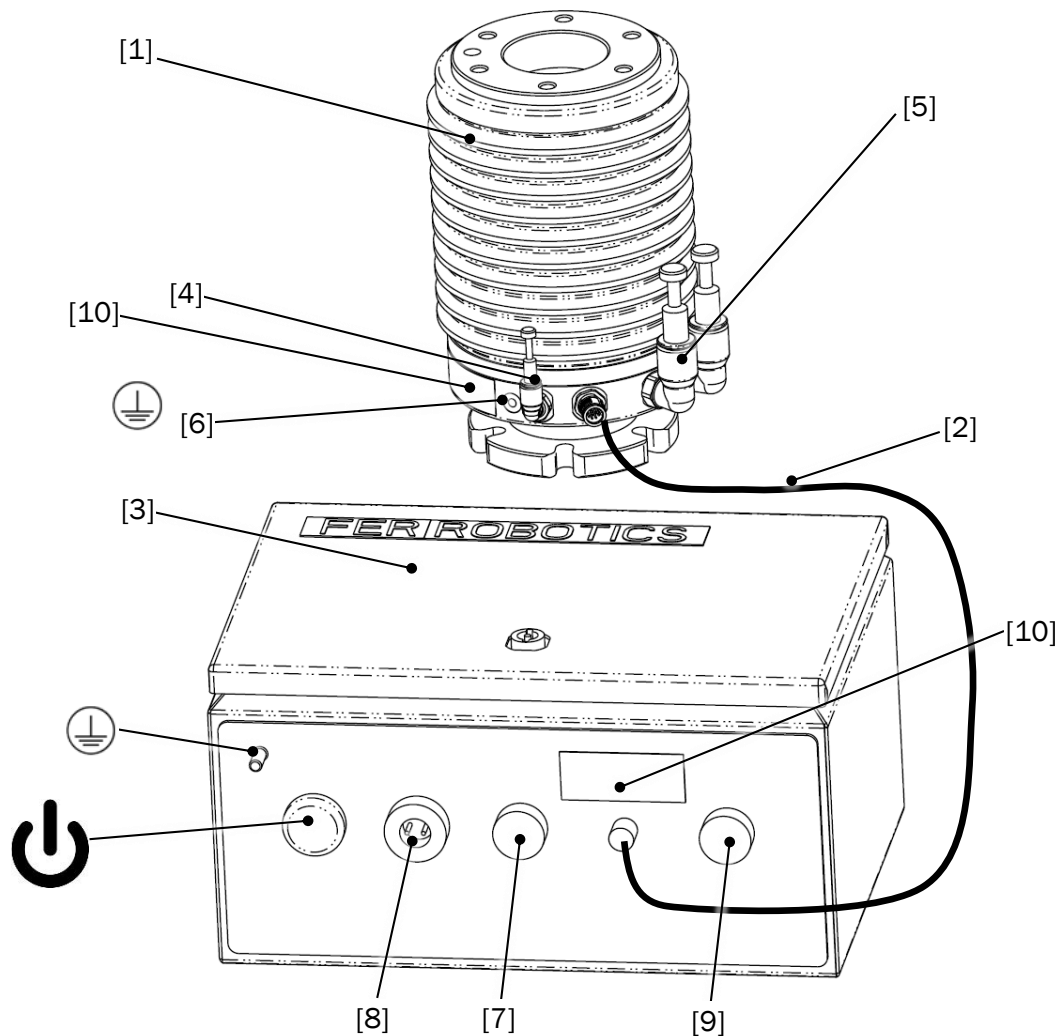


Figure 1: System integration of standard design

- [1] ACF-head
- [2] ACF Cable
- [3] Control Box: LxWxH: 300x200x155 mm
- [4] IN, air: max. 7 bar / Ø 6mm ISO 8573-1- KI.3typ
- [5] OUT (1 & 2), air: Ø 12mm, protect against dust and moisture
- [6] Ground: M5x8, 2.5mm²
- [7] Communication: automation system control
- [8] Power Supply
- [9] Service, optional
- [10] Type label



1.4.1 Technical Data

ACF/	110/01	110/04	110/10	111/01	111/04	111/05	111/10	121/05	121/10	131/05	131/10	151/02
max. Force (pull, push) [N]	100	100	100	100	200	250	250	500	500	800	800	1600
Stroke [mm]	11.5	35.5	98	11.5	35.5	48	98	48	98	48	98	25
weight ACF-head [kg]	1.2	3.2	3.5	1.2	3.5	4.9	6.1	5.1	6.3	5.3	6.5	18
Mx max [Nm]	25	40	40	25	250	350	350	350	350	350	350	1000
My max [Nm]	25	40	40	25	250	350	350	350	350	350	350	1000
Mz max [Nm]	35	30	30	35	250	350	350	350	350	350	350	1000
L0 [mm]	45	72	72	45	74	87	87	87	87	87	87	106
L1 [mm] at stroke 0 mm	143,7	190,5	253	160,7	200,5	236,7	286,7	236,7	286,7	236,7	286,7	266,5
L2 [mm] at stroke 0 mm	147,7	194,5	257	164,7	204,5	240,7	290,7	240,7	290,7	240,7	290,7	271,5
Protection class	IP 40	IP 65										
air supply	Max. 7 bar, 30 µm, ISO 8573-1 Kl.3 (oil & water free)											
air consumption	5-10 l/min											
Communication interface	Ethernet TCP/IP (standard), optional: Profibus, CANopen, Analog I/O, XML,...											
Ambient operation temperature [°C]	+5 ... +45 °C											
Power supply	standard: DC 24 V / 2 A, optional Service: 24 V / 4 A											

Table 1: technical data ACF

1.4.2 Type code

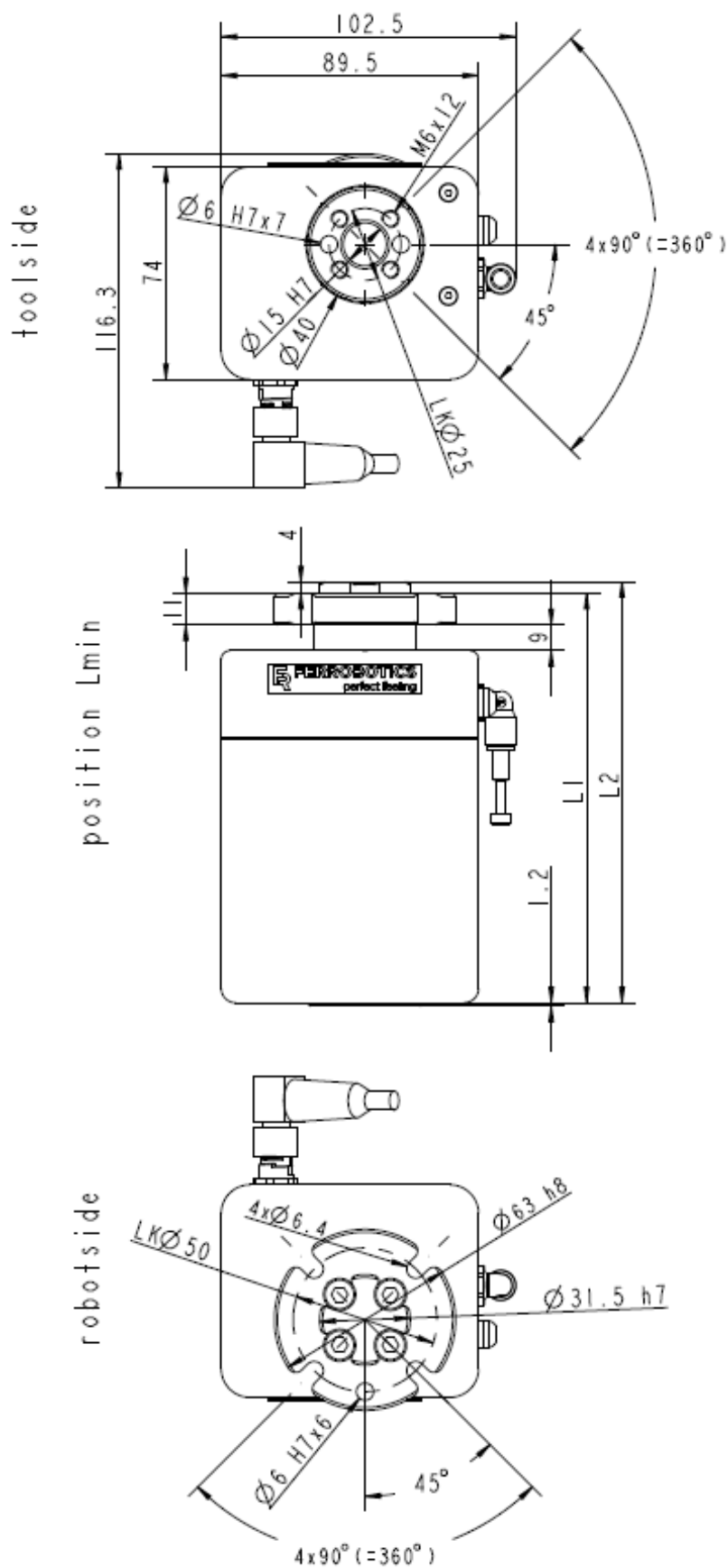
Example ordercode: ACF/ 1 2 1 / 10 E 0

Interface Options	
A	Analog IO
B	Analog IO + Ethernet TCP/IP
D	DeviceNet
E	Ethernet TCP/IP
F	Ethernet XML
G	DeviceNet + Ethernet TCP/IP
H	Ethernet XML + Ethernet TCP/IP
I	EtherNet/IP
K	EtherNet/IP + Ethernet TCP/IP
L	Profibus + Ethernet TCP/IP
M	Modbus TCP
N	Profinet
O	Modbus TCP + Ethernet TCP/IP
P	Profibus
R	Profinet + Ethernet TCP/IP
XX	INCAN
Functional Option Packages	
I	Basic model plus Actual force sensor (afs) plus Offline and InvPos
O	Basic model (without actual force sensor)
U	Basic model plus Actual force sensor (afs) plus Offline, Logging, Monitoring and InvPos
S	Basic model plus Service Interface, afs, Logging, Monitoring, InvPos, iCramp and Offline
D	DIN-Rail-Controller plus Service Interface, afs, Logging, Monitoring, InvPos, iCramp and Offline
XX	INCAN
F	DIN-Rail-INCAN-Controller plus Actual force sensor (afs), Offline and InvPos
G	DIN-Rail-INCAN-Controller plus Service Interface, afs, Logging, Monitoring, InvPos, iCramp and Offline
J	INCAN-Control Box plus Actual force sensor (afs) plus Offline and InvPos
R	INCAN-Control Box plus Service Interface, afs, Logging, Monitoring, InvPos, iCramp and Offline

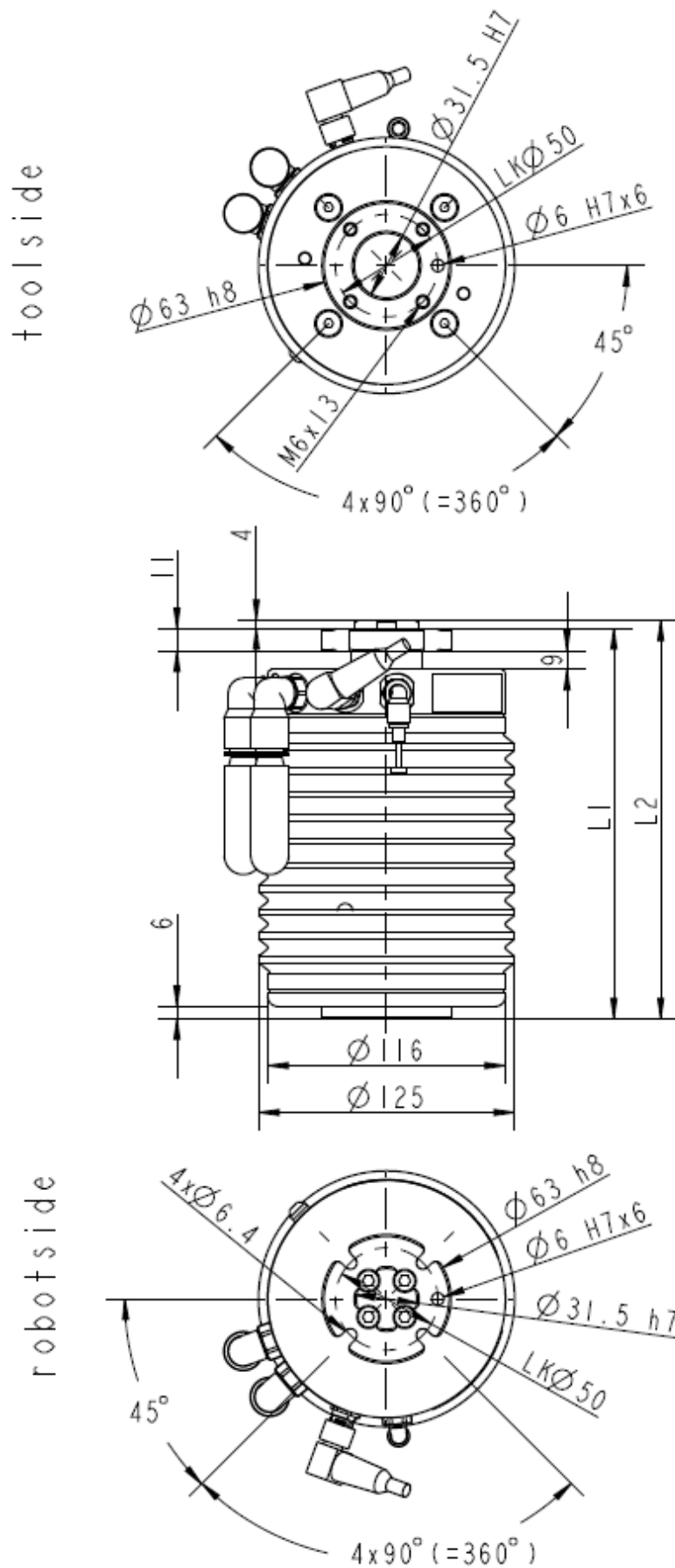
Table 2: Type codes

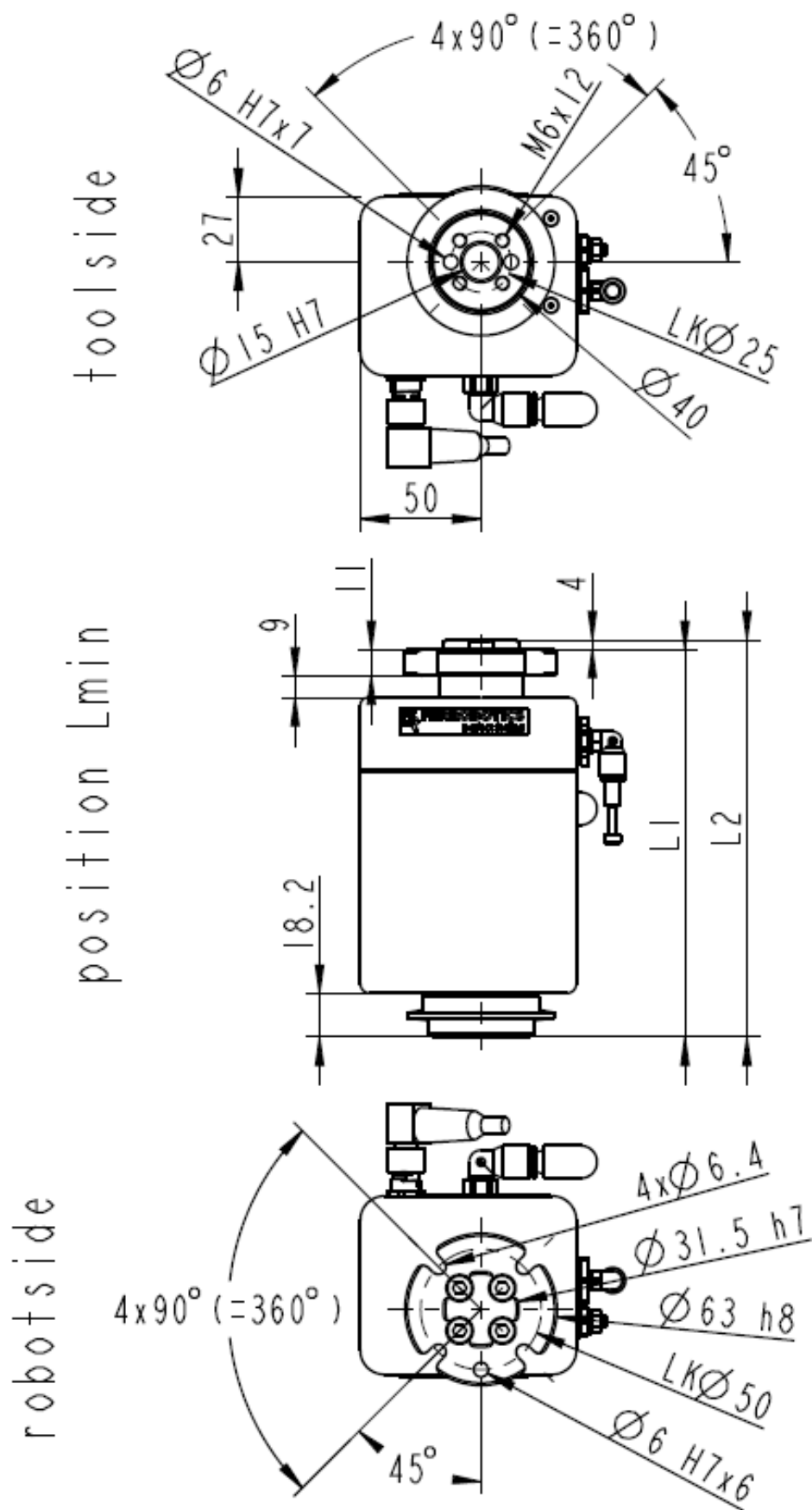
1.4.3 Drawings, ACF-head

ACF/110/01: robotside EN ISO_9409-I-50-4-M6

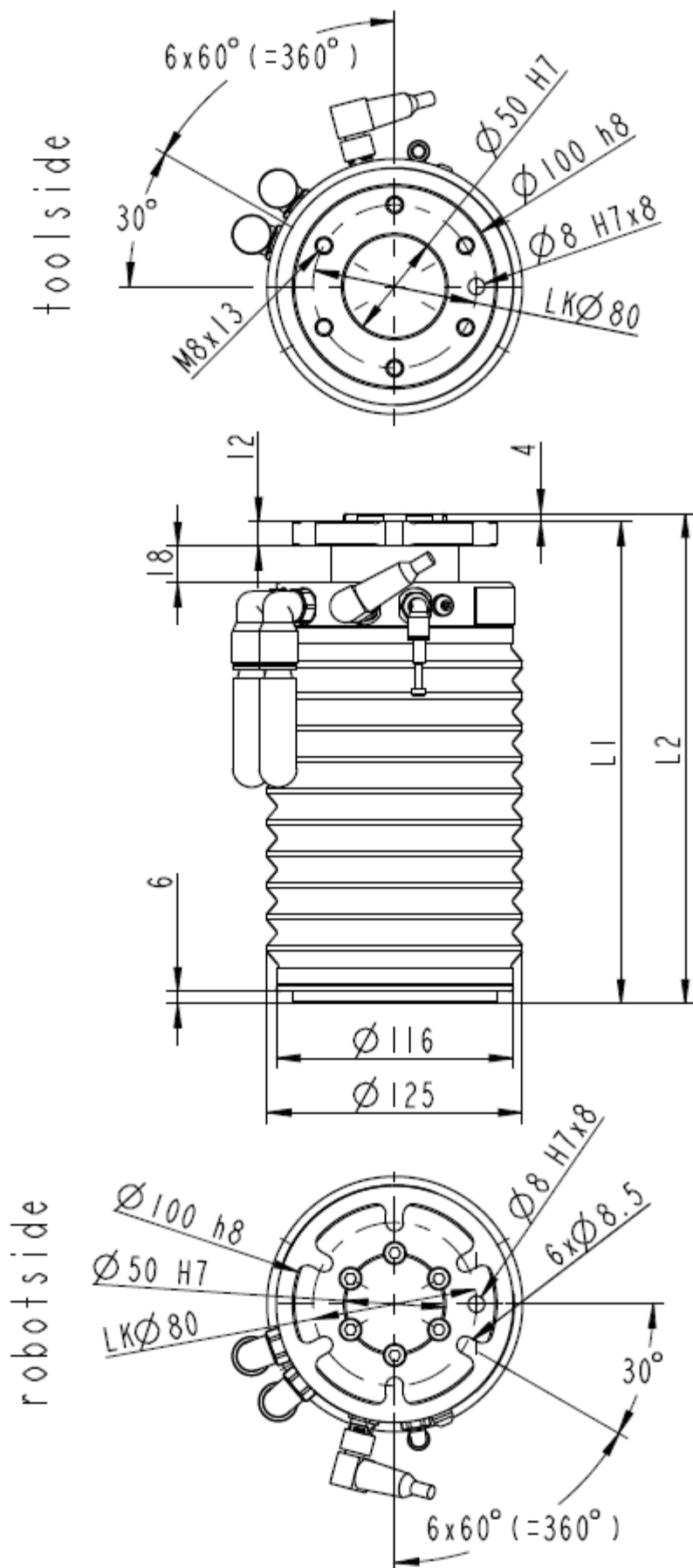


ACF/110/04, ACF/110/10: EN ISO_9409-I-50-4-M6

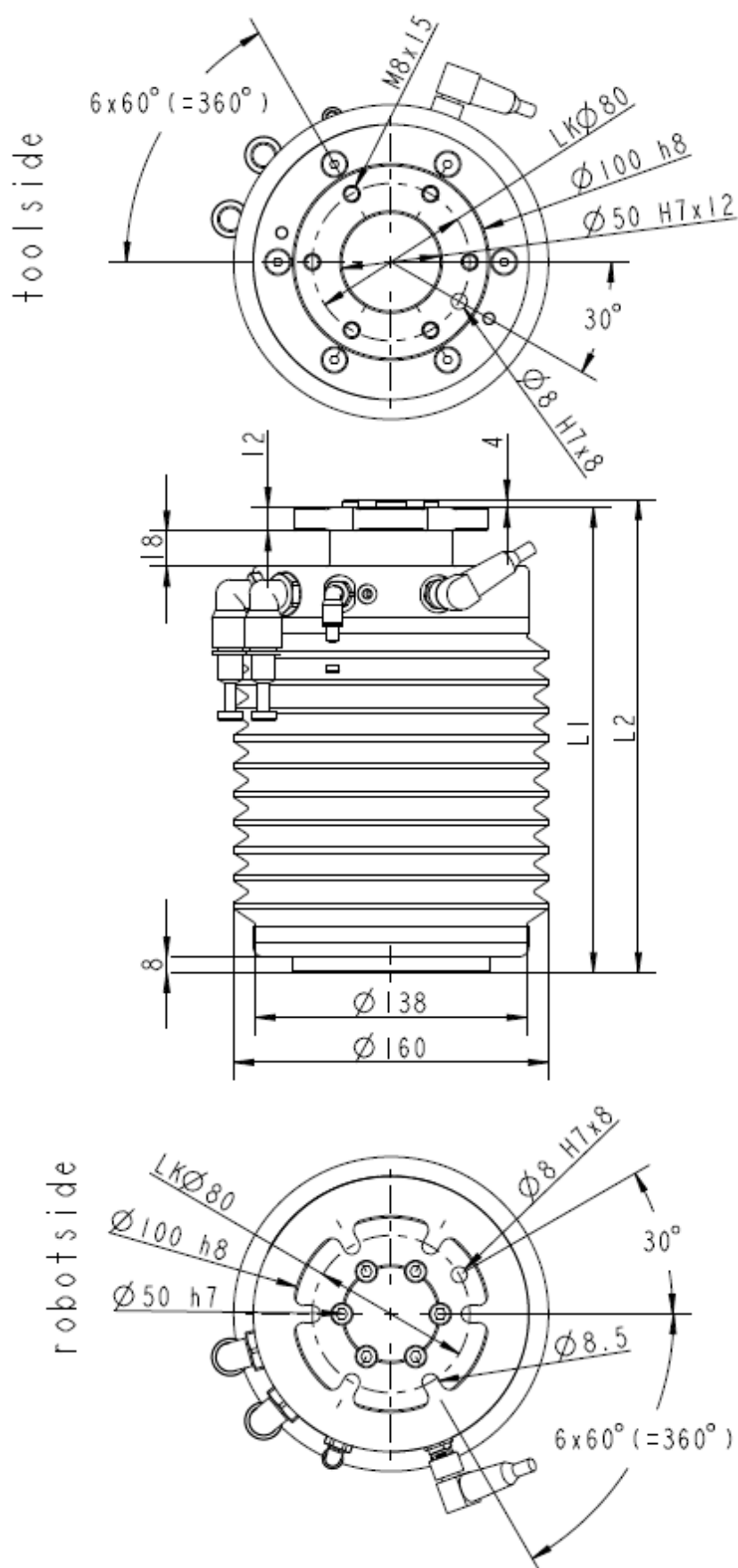




ACF/111/04: EN ISO_9409-I-80-6-M8



ACF/111/05, ACF/111/10, ACF/121/05, ACF/121/10, ACF/131/05, ACF/131/10:
EN ISO_9409-I-80-6-M8



ACF; User Manual; 2022-06



1.5 Characteristic load values

For the values please see Table 1: technical data ACF

ACF/110, ACF/111/04, ACF/111/05, ACF/121,
ACF/131, ACF/151/02

ACF/110/01, ACF/111/01

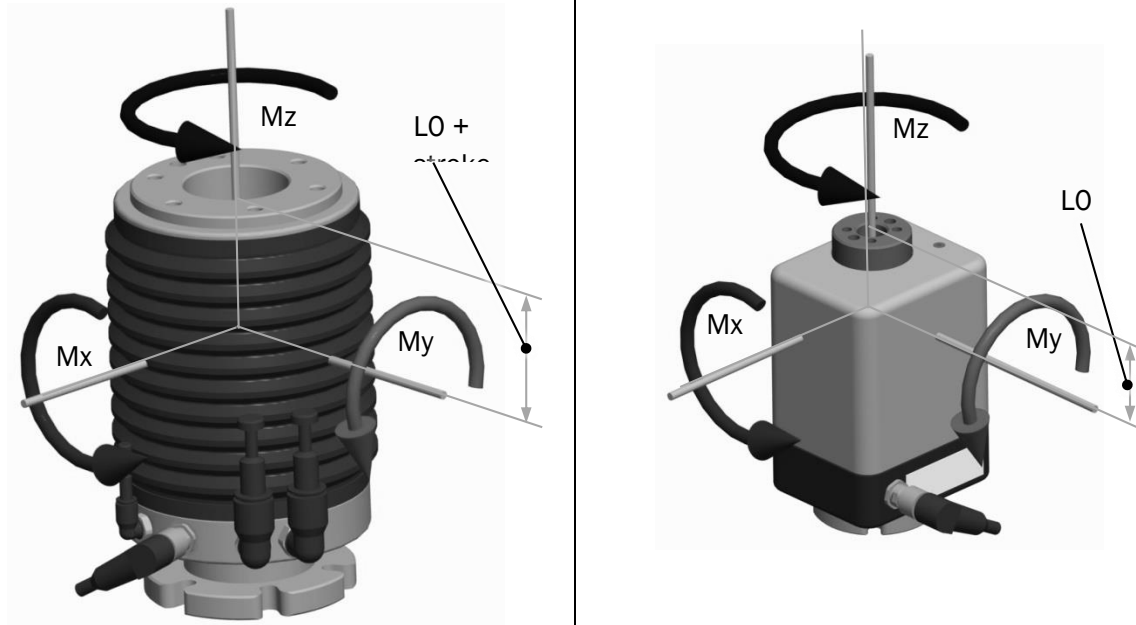




Figure 2: Permissible loads of ACF

	<p>Information</p> <p>LO means the distance between the pivotal point to the tool side flange at stroke = 0 mm.</p> <p>For dimensioning your application please consider the position of centre of gravity of the tool in use, the maximum stroke of your ACF and process forces.</p>
	<p>ATTENTION</p> <p>These load values only apply when the loads do not occur simultaneously.</p>

1.6 Standard product contents

- ACF-head
- Control Box
- Special robot capable 12-pole cable for connection between ACF-head and Control Box, with a length auf 5 m. Cables with other length are also available.

2 Preparation for Commissioning

This chapter contains all information required to prepare for commissioning of the ACF. The checklist included in this chapter must be fulfilled in order to conduct assembly and commissioning.

2.1 Checklist: prior to the first commissioning

Pneumatics	X
At the system is air at a pressure of max. 7 bar available	
The quality of the compressed air conforms to ISO 8573-1 cl.3	
The compressed air is free from oil and water in particular	
The supply air hose for the ACF is 6 mm in diameter (external)	
The exhaust air piping for the ACF is 12 mm in diameter (external)	
Select the connection elements (eg. exhaust filters) on OUT according to the application.	
Mechanics	X
The ISO 9409-1 standard flange can be connected to the system	
The ISO 9409-1 standard flange can be connected to the tool	
Electrics	X
Electricity supply 24 V / 0 V DC is available	
PE connection to the ACF-head is wired with a 2.5 mm ²	
Interfaces	
see Expert Manual	

Table 3: Checklist for Commissioning

2.2 Checklist: daily check before every operation

Pneumatics	X
Connection of compressed air connections / exhaust air connections – firm	
Traction on compressed air hose / exhaust air hose	
Compressed air supply produced and stable (correct pressure, quality)	
Kinks in the compressed air piping	
Auditory check of whether air is escaping	
Check the flow rate of connection elements (eg. exhaust filters) on OUT, if necessary cleaning from inside to outside (recommended once a week).	
Electrics	X
Correct connection of the data cable (connection between Control Box and ACF-head) – screwed on tightly, correct position	
Correct connection of the energy supply (on the Control Box) – screwed on tightly, correct position	
Correct connection of the data cable (connection between Control Box and system control unit) – screwed on tightly, correct position	
Traction on data cable / electric supply / connection between system and ACF	
Electricity supply produced (correct voltage, electricity)	
Mechanics	X
Mechanical damage (e.g. due to a collision)	
Check bellows for cracks, holes and detachment of the bellows	
Correct installation onto the system / firm screws	
Correct assembly of the tool / firm screws	

Table 4: Daily Checklist before Every Operation

3 Instructions for assembly and commissioning

The necessary pre-requisites for assembly and commissioning of the ACF are described in chapter 2: 'Preparation for Commissioning'.

**CAUTION!**

Ensure that the compressed air supply is switched off before connecting or disconnecting compressed air piping.

During commissioning, it is necessary to distinguish between two technologies

- Standard and
- INCAN.

**ATTENTION**

Both technologies, Standard and INCAN, are not compatible with each other. Disregarding this information can result in damage.

**ATTENTION**

When disconnecting and connecting wires between the head and controller, the controller is to be voltage-free!

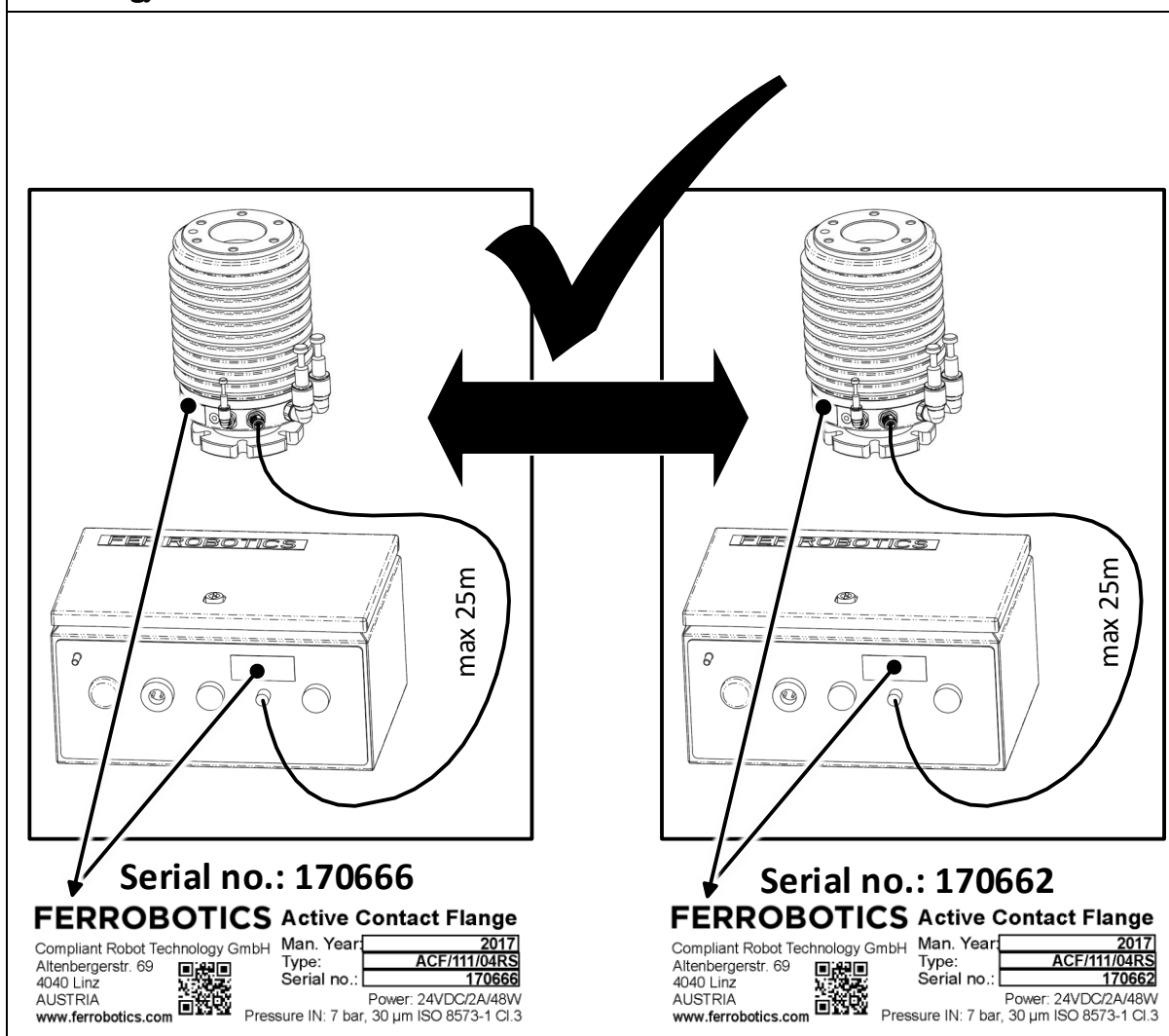
**ATTENTION**

Identical serial number of ACF-head and ACF controller necessary. EXCEPT for INCAN: Only an identical serial number ending with "XX" of the ACF head and ACF controller is necessary.

Standard Technology

The standard technology makes it necessary to match the controller and the head, as head-specific data are stored on the controller.

Technology: Standard



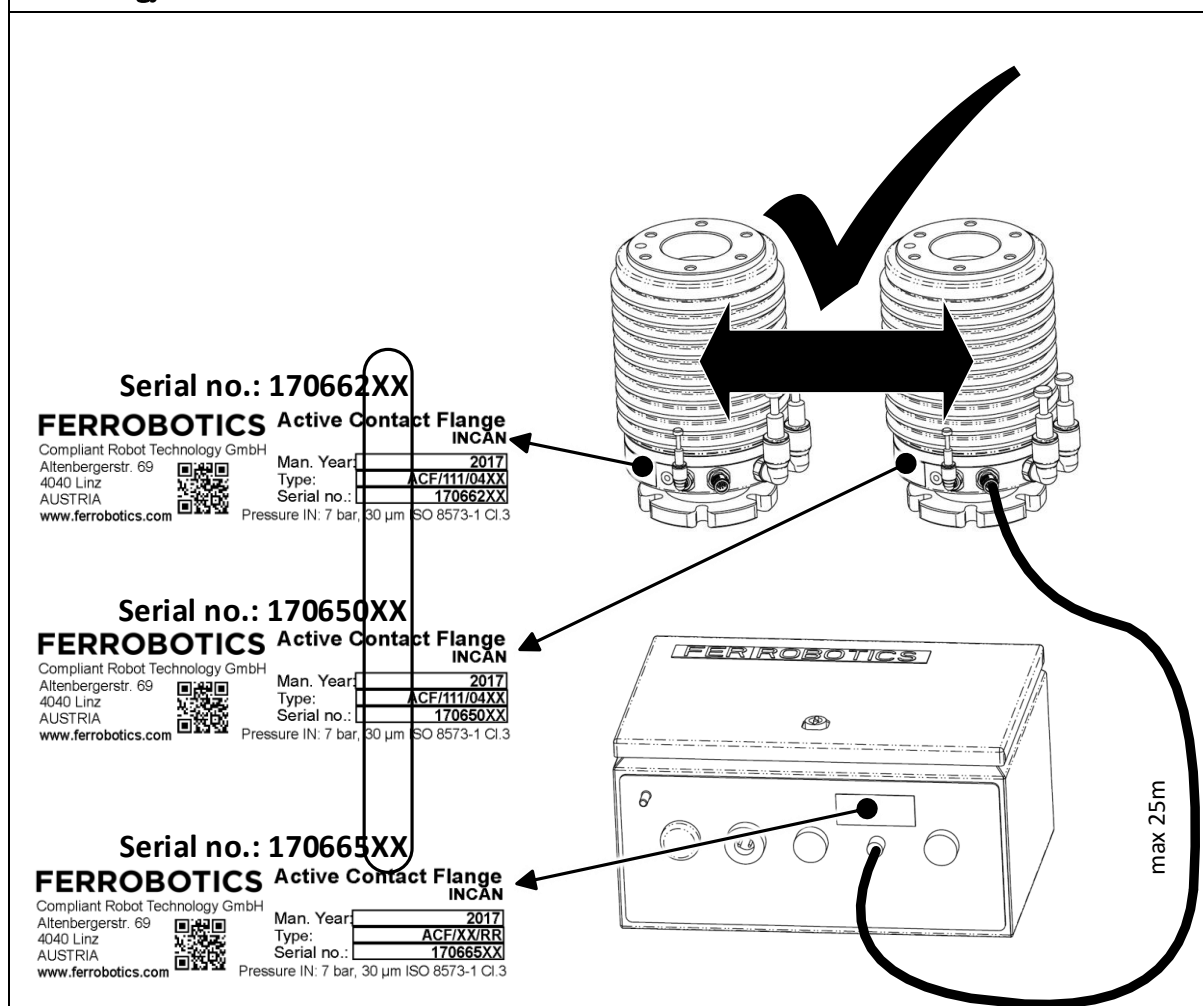
ATTENTION

Identical serial number of ACF-head and ACF controller necessary. The head and controller must be mounted and operated together.

INCAN Technology

For the INCAN technology, the head can be separated and replaced, as all head-specific data are stored on the head itself and the data on the controller are updated when connecting the head.

Technology: INCAN



Information

Only an identical serial number ending with "XX" of the ACF head and ACF controller is necessary.

INCAN products are consistently designated as XX with the respective

- product name and
- serial number.



Information

Please refer to the Expert Manual for INCAN product compatibility between the controller and head.

3.1 Assembly of the ACF

Make sure that the serial number of the ACF fits the number on the control box

- Make sure that the serial number of the ACF-head matches with the serial number of the Control Box.
- Establish mechanical connection between system, ACF and tool. Consider the assembly sketch below.
- Make sure that the ACF is grounded via the system.
- Remove the blind plugs from air supply and air exhaust.
- Apply the appropriate connecting elements (eg. exhaust filters) for OUT.
- Caution: Filter type affects the IP classification; IP classification may change.
- Choose the connection elements on OUT appropriate to application. Where relevant, the supplied standard filter set from FerRobotics does not apply to all ACF applications!
- Usage must not cause partial vacuum in the ACF, that compresses the folding bellows.
- Connect compressed air supply to active ACF (IN).
- Connect ACF to the supplied Control Box with the connection cable.
- Ensure proper strain relief for the connection cable, all other cables and supply lines.
- Establish interface connection between system and Control Box / controller.
- Establish power supply for Control Box/controller.
- Switch on Control Box and wait 1 minute until the ACF-control has started up.
- Establish connection via the communication interface.

Technical assembly sketch system side flange

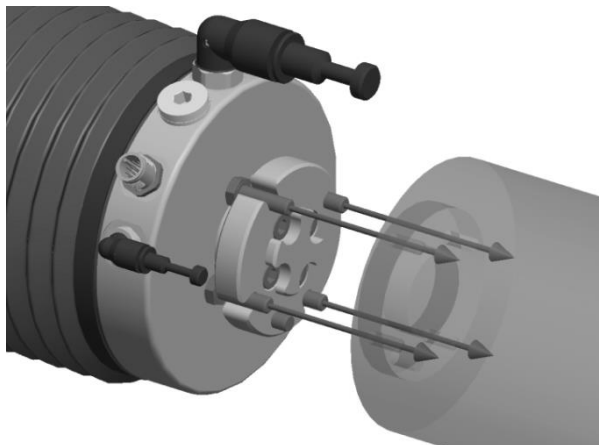


Figure 3: Screw connection of the mechanical standard flange for assembly




Thread depths for the tool side flange see chapter 1.4.3

3.2 Mounting Control Box

Mounting position

The Control Box may be mounted in a way that the cables lead away from the Control Box in downwards or sideways direction.

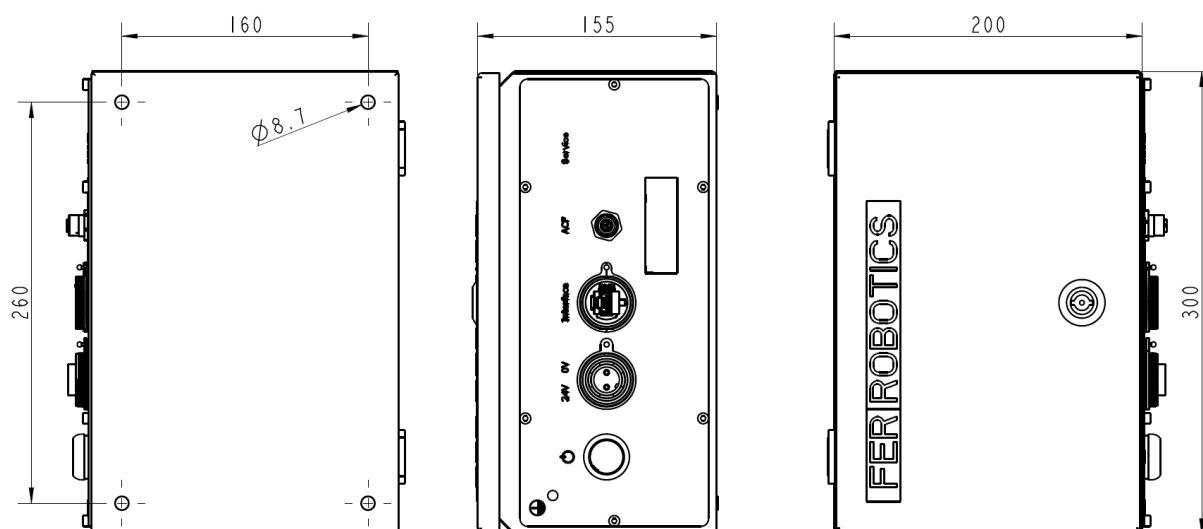
Power supply

	<p>WARNING!</p> <p>Personal exposure to hazards due to electric shock</p> <ul style="list-style-type: none"> Only supply the power-on box with safety extra-low voltage (e.g. SELV or PELV in accordance with EN 61131-2:2007) Only connect potentials and circuits to connections, terminals or interfaces up to 50 V nominal voltage which have safe insulation at dangerous voltages (e.g. via adequate insulation and dielectric strength).
	<p>WARNING!</p> <p>For power supply (24 V DC) use the enclosed connector to keep the protection class. For the Interface use the right connection cable und connector (not included in the delivery) to keep the protection class</p>
	<p>Information</p> <p>The Control Box is equipped with a fuse.</p>

Standards and Directives

The Control Box complies with the following standards and directives: Directive 2004/108/EG, harmonized standard EN 61439-1:2009.

Drawing [mm]



4 Operation of ACF

4.1 Switching on and off (switch on the Control Box)

The ACF is ready for communication approximately 1 minute after switch-on.

4.2 Operating parameters

Figure 4 shows the parameters that are received and sent by the ACF. System and Control Box communicate these parameters via the interface connection.

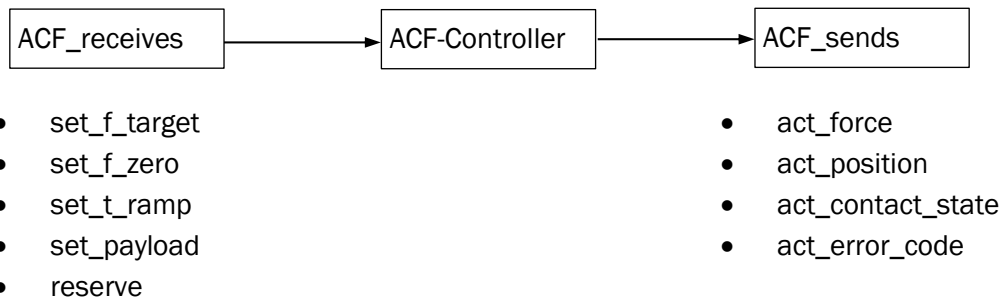


Figure 4: Received and sent parameters of the ACF

set_payload

Determine the weight of the tool, this value is the payload.

set_f_target

A positive target force means the ACF will be pushing, while a negative target force means pulling.

set_f_zero

This value is necessary for the Force ramp, for details see the chapter Force ramp functionality.

set_t_ramp

This value is necessary for the Force ramp, for details see the chapter Force ramp functionality.

reserve

not in use

Force ramp functionality

The force ramp allows making contact with a surface smoothly in order to avoid abrupt force onto the workpiece. Set a zero force (**set_f_zero**) that will be applied as long as the ACF does not detect contact. Set the time of the force ramp with **set_t_ramp**. Deactivate the force ramp functionality by setting **set_t_ramp** to 0.

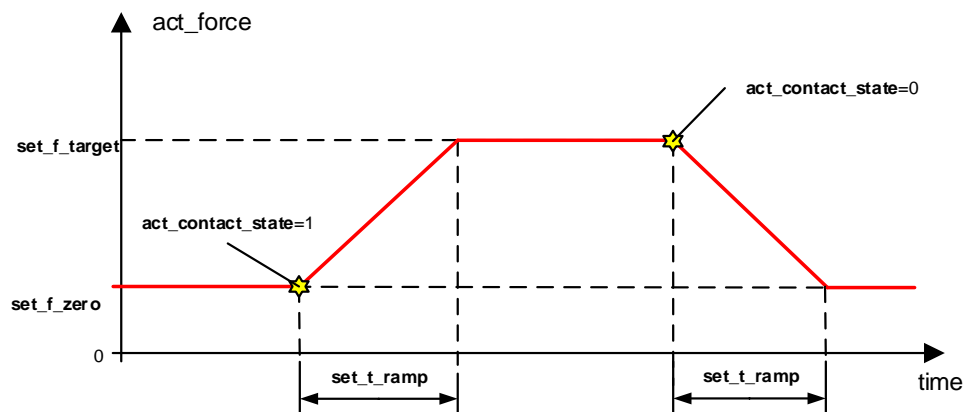


Figure 5: Progress of the force ramp depending on the set parameters

act_force

Returns the optionally detected actual force. In the standard type „Without force detection” the ACF will only report back the set target force.

act_contact_state

Reports whether contact was detected or not. In the event of quick position changes at low set forces the applied force might not accelerate the payload sufficiently to hold the contact. In this case the system must monitor **act_contact_state** and adjust the target force for the application.

act_position

Returns the current stroke position of the ACF. The value 0 means that the ACF is at its minimum length stop. The maximum stroke value means that the ACF is at its maximum length stop. The stroke position signal is quantized to 0.1 mm.

act_error_code

Indicates whether the ACF works correctly or not. The error codes of the ACF are indicated as binary number. Each bit indicates a specific error. For transfer to the automation system the error code is converted to a decimal number. To correctly evaluate an error code in the automation system the transferred decimal number must be reconverted to the original binary number.

Bit	Value	Description
0	1	valve error
1	2	sensor error
2	4	Head and PLC not compatible
3	8	set_f_target cannot be reached
4	16	set_f_zero set to 0 (set_f_target and set_f_zero must have the same sign)
5	32	one or more input values out of range
6	64	INCAN no communication
7	128	INCAN parameter read not finished
Bit	Value	Description for devices with electrical Inverter
8	256	Inverter not ready for operation
9	512	Inverter no supply
10	1024	Inverter Error
11	2048	Inverter STO active
12	4096	Inverter detached
13	8192	Inverter device configuration not valid
14	16384	Bit 14 not used
15	32768	Bit 15 not used

Table 5: Description of error codes

**Bit 0: „valve error“**

A valve is reporting an error. Either the pressure supply is insufficient or the valve is damaged. Check pressure supply. If the error occurs combined with bit 1 „sensor error“ the connection cable is probably not connected or damaged.

Bit 1: „sensor error“

A sensor is damaged. The ACF must be serviced. Please check the ACF cable.

Bit 2: "Head and controller are not compatible"

Please refer to the Expert Manual for INCAN product compatibility between the controller and head.

Bit 3: „set_f_target cannot be reached “

The ACF cannot reach the target force with the currently set payload at the current angle. Change parameters or the angle to gravity of your application.

Bit 4: „set_f_zero set to 0“

The signs of set_f_target and set_f_zero are not identical. Set the parameters with the same sign.

Bit 5: „one or more input values out of range“

At least one set parameter is out of range. Check the range of values for your interface.

Bit 6: "INCAN no communication"

No cyclical communication can be established; check the connection wire between the controller and head.

Bit 7: "Reading of INCAN parameters not complete"

The parameter data and service data have not been read completely.

**Bit 8: „Inverter not ready for operation “**

The inverter for the AOK does not report Ready. Pay attention to the status code of the inverter on the device, for details refer to the operating instructions of the inverter

Bit 9: „Inverter no supply “

The inverter for the AOK does not report any mains. Please make mains supply or turn main switch to ON.

Bit 10: „Inverter Error “

The inverter for the AOK reports errors. Check if all cables are properly connected. Pay attention to the status code of the inverter on the device, for details refer to the operating instructions of the inverter.

Bit 11: „Inverter STO active “

The inverter for the AOK reports Safe Torque OFF. The emergency stop must be closed.

Bit 12: “Inverter detached”

The inverter is detached from the head and the head can be changed. The signal shows a disconnected connection when the device is to be exchanged and a disconnect is set. This signal is only available for the Multi Device Box.

Bit 13: “Inverter device configuration not valid”

The device configuration is not valid please send the connect signal (set_t_ramp = 25,3) to load the current motor parameter. This signal indicates that the actual motor parameter set does not match the desired motor parameter from the device.

This signal is only available for the Multi Device Box.

Example:

The error bits 1, 3 and 5 are set:

Bit	7	6	5	4	3	2	1	0
Wert	0	0	1	0	1	0	1	0

The binary code 101010 is converted to a decimal number ($2+8+32 = 42$) and so transmitted to the automation system. The system needs to convert the number back to the binary system to evaluate the single error bits.

4.3 ACF Controller

For details see FerRobotics ACF Expert Manual.

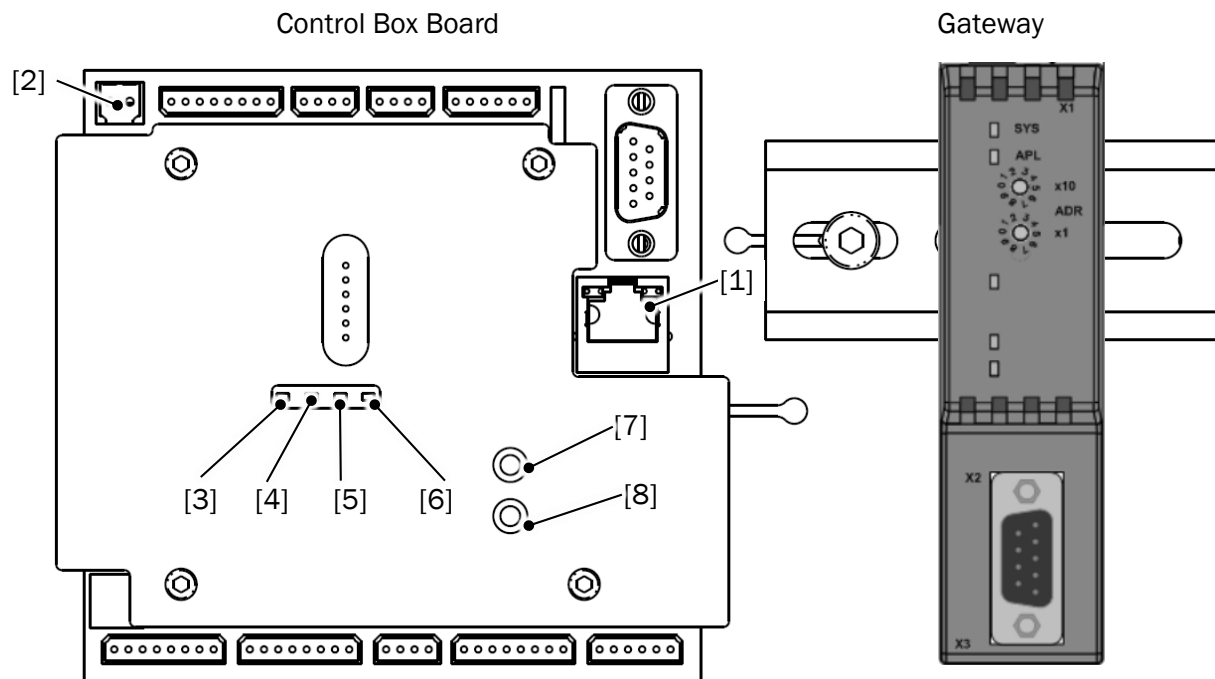


Figure 6: Control Box

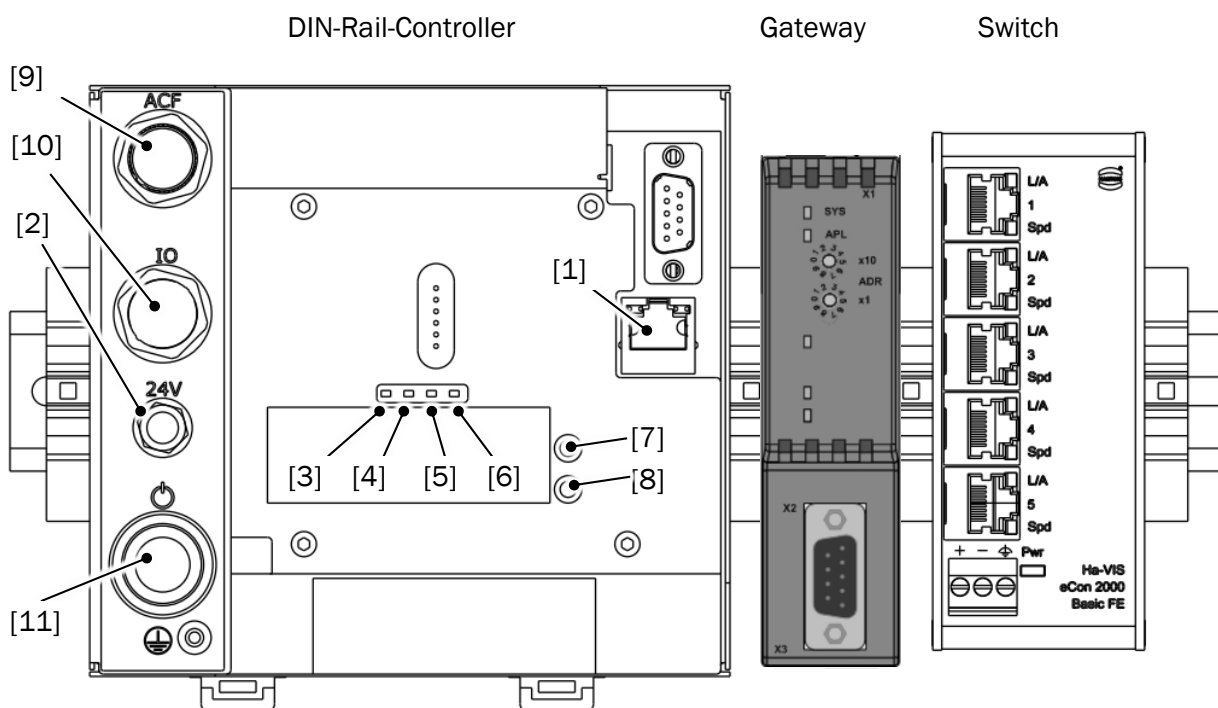


Figure 7 DIN-Rail-Controller









[1]	LAN
[2]	0V / +24V power supply
[3]	green LED for power 24V
[4]	green LED for RUN blinks when controller runs, or lights with CANopen
[5]	red LED for ERROR blinks or lights when there is a hardware error on the board
[6]	orange LED for Aux lights when server runs blinks when board is reset
[7]	Aux button
[8]	Def button
[9]	ACF
[10]	Analog I/O
[11]	OFF button

4.4 Interfaces

Please see the Expert Manual for ACF.

4.5 Important Information

	ATTENTION The ACF contains sensitive electronic and mechanical components. Do not stress the device by impact-like shocks. Collisions during operation, dropping on the floor during transport or commissioning.
	Information The maximum forces specified can only be attained with sufficient compressed air supply of 7 bar
	Information When payload is high, the force of gravity can decrease the maximum force attainable.
	Information A contact force > 5 N is recommended for productive applications.
	Information Make sure that your application moves over the whole stroke of the ACF regularly to ensure optimal results over long time use.
	Information If the ACF oscillates in your application, check the settings for the force ramp and payload (set_payload).

Cleaning

Wipe soiled surfaces with a moist cloth and detergent which is suitable for plastic.

Apply the appropriate connecting elements (eg. exhaust filters) for OUT. Mind that the filter type affects the IP classification; IP classification may change. Choose the connection elements on OUT appropriate to the application. Where relevant, the supplied standard filter set from FerRobotics does not apply to all ACF applications! Usage must not cause partial vacuum in the ACF that compresses the folding bellows. Regular cleaning of filter from inside to outside.

Storage and transportation

Store shielded from dirt, dust, moisture and temperature fluctuations.

In order to ensure the smooth running of the ACF-head, please move the ACF every two months over the entire stroke range; this can also be carried out by hand.

Disposal

When the ACF is no longer being used, it must be disposed of in accordance with the relevant country-specific environmental protection provisions. Electronic components must be disposed of in accordance with the WEEE Directive.



5 Safety

The ACF is an incomplete machine (module), intended for integration into systems, the conception and manufacture of which permits application in automation systems in compliance with the applicable regulations and standards. The manufacturer who places the complete machine on the market, i.e. generally the system operator, is responsible for compliance with the regulations and standards.

Before every operation, the operator of the complete system is obliged to perform a risk analysis relevant to the usage situation. The operator may only apply CE marking to the complete system and issue a declaration of conformity following documented proof of compliance with the machinery safety directive (Directive 2006/42/EC).

Individuals, the ACF, and other machinery, which are working efficiently and safely with the ACF, can be endangered when the ACF is not used as intended or used inappropriately.

Improper or incorrect use of the ACF or system into which it is incorporated, may be dangerous to individuals, the ACF, and for other equipment.

Anyone who is responsible for the installation, commissioning and maintenance of the ACF and system into which incorporated, must read and understand this Manual completely, especially the chapter entitled "Safety".

5.1 Usage as intended

The ACF may only be used within the framework of its technical data. Usage as intended also includes compliance with the commissioning, assembly, operating and environmental conditions prescribed by the manufacturer. Other usage is not considered. The manufacturer and others in the distribution chain will not be held liable for damages resulting from such usage.

The intended use of the ACF is the exercise of pull and push forces.

The ACF may not be used:

- In environments with strong temperature fluctuations
- Outdoors
- In areas with particular hygiene requirements
- In medical areas
- In fluids (e.g. water)
- In areas at risk of conflagration or explosion

5.2 General safety precautions

It is strictly forbidden to open the casing of the ACF, make changes, or remove the protective bellows. Repairs to components within the device may only be performed by the manufacturer or an authorized customer service representative.

The ACF must be checked and re-approved by the manufacturer or an authorized customer service representative after a collision.

A check of the ACF in accordance with the 'Daily Check Before Every Operation' checklist must be performed after assembly and on a daily basis.

It is improper and forbidden to operate the ACF if obvious defects or damage are visible, if malfunctioning is suspected or air escapes in an uncontrolled manner.

The ACF may only be operated if it has been correctly installed in an automation system as specified in the installation instructions see chapter 3 and serviced at the prescribed intervals.

In applications with flying sparks or increased heat, a spark / heat protection shield must also be installed, which protects the ACF (especially the bellows) from sparks and heat.

It is expressly forbidden to make additional drilled holes or threads in the ACF.

5.3 Residual risks during operation

Energy supply:

The user is responsible for ensuring that no hazard results from a power cut (compressed air or electricity) or when the energy supply is restored. The ACF contains no safety devices for power cuts or restoration of the energy supply.

Compressed air:

The user is responsible for ensuring that the ACF is supplied with the correct air pressure and the correct compressed air quality.

Electricity:

The user is responsible for ensuring that the ACF is supplied with the correct voltage and current. The manufacturer has made no provision for voltage- and current-limiting devices.

Correct assembly of the ACF:

The user is responsible for ensuring that the ACF is correctly installed into the system and the tool is correctly (in accordance with the installation instructions, see chapter 3) installed on the ACF.



WARNING!

To operate the ACF/151/02, an additional safety connection (e.g. steel cable) must be attached between the robot and the tool side. This must be able to take the load of the entire tool side, but must not affect the function of the ACF.

ACF in operation:

The ACF and, in particular, the bellows may not be touched during operation. This also applies to set-up operation. Otherwise, injuries could occur as a result of movement of the ACF.

The user is responsible for ensuring that no person remains in the work area of the ACF or in the work area of the complete system during operation.

Noise caused by compressed air:

Moving compressed air (cabling, fixtures, etc.) can cause unwanted noise pollution. The user is responsible for making noise reduction measures, if necessary.


5.4 Configuration of the emergency stop (emergency off switch)

The user is responsible for ensuring that the ACF is integrated into the emergency stop (emergency off switch) circuit of the complete system. FerRobotics recommends that a common emergency stop (emergency off switch) concept be created for the complete system, including the ACF. When configuring the emergency stop (emergency off switch) concept it must also be ensured that not only the ACF, but also the tool attached thereto is integrated into this concept.

In principle, it is possible to integrate the ACF into a concept with stop category 0 or stop category 1 in accordance with EN ISO 13850 or into a concept with stop category 2 in accordance with EN 60204-1.


Information on stop category 0 (emergency off switch):

If you disconnect the energy supply (electric or pneumatic) to the ACF, the air stored in the ACF is released and is in a neutral condition. This means that the ACF no longer can actively move, but neither does it remain in a fixed position.

	<p>ATTENTION</p> <p>The ACF can move to its final position when the emergency off switch is triggered due to the impact of gravity. In some instances, the ACF will be oriented upwards, fully extended and will have mounted a heavy tool. Due to gravity, the ACF is then compressed by the weight of the tool as quickly as the air can escape.</p>
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Information on stop category 1 or stop category 2:

If the energy supply is not immediately disconnected it is possible to move the ACF into a final position before the final stop. To this end, in the event of orientation against gravity, a negative force can be sent to the control in order to move the ACF to the retracted final position and, if necessary, only to disconnect the energy supply thereafter. If the robot lifts from the work piece surface, the ACF then moves to the extended final position. The ACF can thus be prevented from making an uncontrolled movement due to gravity.

	<p>WARNING!</p> <p>This function is executed via a standard control function and is therefore not a superior safety function.</p>
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Should you have any further questions or require assistance with the integration of the ACF into your safety concept, FerRobotics will be happy to help you at any time.

5.5 Warranties/Limitation of Warranty

This Manual and the sale and use of the ACF is subject to FerRobotics' Limited Warranties and Limitations of Liability. FerRobotics' Limited Warranties and Limitations of Liability can be found at www.ferrobotics.com, Impressum. You may also call FerRobotics at (+43 720 10810701) in order to receive a copy.



6 Installation Declaration for Installing an Incomplete Machine

As defined by the European Community Directive 2006/42/EG regarding machines (Appendix II B)
FerRobotics Compliant Robot Technology GmbH
Altenbergerstr. 69
Science Park 4, 5. OG
A-4040 Linz

Declares herewith that the product:

ACF, Active Contact Flange

Model: ACF/110/111/121/131/151

Constitutes an incomplete machine (assembly group), the commissioning of which is forbidden until it can be ascertained that the entire machine, into which the incomplete machine is to be installed, satisfies the stipulations of

DIRECTIVE 2006/42/EG OF THE EUROPEAN PARLIAMENT AND COUNCIL of 17 May 2006 regarding machines and the amendment to Directive 95/16/EG (Revised Version).

The following fundamental specifications of this Directive were complied with when designing and manufacturing the above-mentioned incomplete machine: 1.1.2, 1.1.3, 1.1.5, 1.2.1, 1.3.2, 1.3.3, 1.3.4, 1.4.1, 1.5.1, 1.5.2, 1.5.3, 1.5.4, 1.5.6, 1.5.8, 1.5.13, 1.7.1, 1.7.1.1, 1.7.2, 1.7.3, 1.7.4, 1.7.4.1, 1.7.4.2, 1.7.4.3

Furthermore, the following standards were provided during the design and manufacturing phase:

- EN 349 Safety of Machinery; Minimum spacing to avoid crushing limbs
- EN 1050 Safety of Machinery – Guidelines for risk assessment
- EN ISO 9409-1 Industrial Robots – Mechanical interfaces - Section 1: Sheets
- EN ISO 12100 Sections 1+ 2 Safety of Machinery – Basic concepts, general guidelines on layout

As required by Directive 2006/42/EG, special technical documentation in accordance with Appendix VII B is available for the above-mentioned product and can be provided or conveyed in digital form if the market surveillance authority sees fit.

Authorized representative for compiling the relevant technical documentation is:

Dipl.-Ing. Dr. Ronald Naderer, MBA
(ronald.naderer@ferrobotics.at)
FerRobotics Compliant Robot Technology GmbH
Altenbergerstr. 69
Science Park 4, 5. OG
A-4040 Linz

ROHS COMPLIANCE

Product: Active Contact Flange

As producer of the product stated above we hereby confirm the compliance with:

The Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2002/95/EC (RoHS)

Linz, June 2022

Dipl.-Ing. Dr. Ronald Naderer, MBA
(Managing Director)

7 Service / Maintenance



ATTENTION

The regular professional service from the manufacturer guarantees optimum product properties and performance. The life of the product and associated service intervals depend strong on your operating conditions. You have chosen a superior high-tech product. For the best result and highest quality, there is a service package.



Information

Suggested service interval: **1 year**

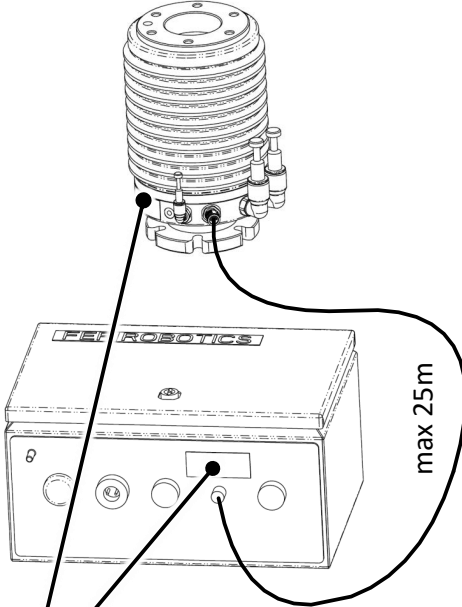
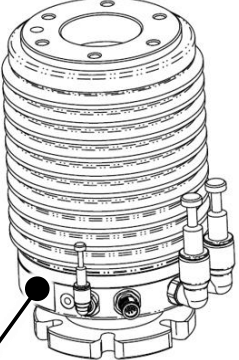
To make an appointment simply contact your supplier!



ATTENTION

For technical reasons, service procedures always require the entire ACF (consisting of the head, cable and control box) to be sent to FerRobotics! EXCEPT for INCAN: here, it is only necessary to send the head.

Required components for planned service:

Standard	INCAN
 <p>Serial no.: 170666</p> <p>FERROBOTICS Active Contact Flange</p> <p>Compliant Robot Technology GmbH Man. Year: 2017 Altenbergerstr. 69 Type: ACF/111/04RS 4040 Linz Serial no.: 170666 AUSTRIA Power: 24VDC/2A/48W www.ferrobotics.com Pressure IN: 7 bar, 30 µm ISO 8573-1 Cl.3</p>	 <p>Serial no.: 170650XX</p> <p>FERROBOTICS Active Contact Flange INCAN</p> <p>Compliant Robot Technology GmbH Man. Year: 2017 Altenbergerstr. 69 Type: ACF/111/04XX 4040 Linz Serial no.: 170650XX AUSTRIA Pressure IN: 7 bar, 30 µm ISO 8573-1 Cl.3 www.ferrobotics.com</p>



Information

In case of repairs or updates, the INCAN technology may also require the cable to be delivered along with the controller.



Contact Service and loan devices

If you need a loaner during the service / overhaul period, please contact us at:

Email: service@ferrobotics.at

Tel: +43 720 108107 - 01

Tel: +43 732 2468 - 6342

Fax: +43 720 108107 - 10

Fax: +43 732 2468 - 6345