

SERVICE

Intelligent Global Eletrons Module (iGEM)



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MAINTENANCE MODE

English

Maintenance Mode
Intelligent Global Electronics Module
Dresser Europe GmbH
Wayne Germany
Dresser Inc.
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1 Introduction

This manual describes how to operate the maintenance mode of a dispenser equipped with the Global Electronics Module (IGEM).

1.1 Technical Support

Refer service problems to tech support.

Technical Support Office Locations and Phone Numbers:

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1.2 Revision History:

Revision	Release	Description
1.0		Creation
1.1	7.13	Added: F00.04 soft Coldstart
	7.13	Added: F16.02, Confirm WIP serial number change (when WIP has been replaced)
	7.13	Added: F16.04, Verify WIP serial number change
	7.13	Added: F20.00 new Protocol type 7 = ATCL
	7.13	Added/changed F20.01 new Baud rate structure
	7.13	Added: F26.01 Manual VAP Calibration without the Buerkert Handterminal
	7.13	Added: F29.3N, F30.3N Max. full flow rate (to be used for flow selection by button -40/80 l/min.) , 10-180 (units of Liters/min.)
	7.13	Added: F37 sub-functions
		.01 Maximum logical nozzle number for each side
		.02 Dispenser geometry
		.03 General valve type for all primary, secondary and third valves
		.04 UPD re-orientation, left to right or right to left
		.05 UPD mapping
	7.13	Added: F39, Error level assignment
	7.13	Added: F40, Manual VAP calibration without the Buerkert Handterminal
	7.13	Added: F41, Backlight, Red/Green outputs, Spare In/Outputs assignment
	7.13	Added: F42, GHM rotation (meter + valves)
	7.13	Added: S27.01-08, Statistic of the WIP (WIP serial number) S27.11-18, Number of WIP change
1.2	7.15	Added: F10/11.6N High capacity button assignment F10/11.7N Low capacity button assignment
	7.15	Added: F14.01 Display mode after sale paid 5 = Money and Volume is actual, Unit Price is for 5 sec. actual (U.K. request)
	7.15	Added: F19.16 and F19.25 hose test volume
	7.15	Changed: F19.10 = Range from 0-9.
	7.15	Added: F21.06 = 4 Show primary volume at the amount display and secondary volume at the unit price display F21.06 = 5 flow rate indication (U.K. request) F21.06 = 6 flow rate indication (U.K. request) F21.06 = 7 flow rate indication (U.K. request) F21.06 = 8 flow rate indication (U.K. request)
	7.15	Added: F23.06, hose test time
	7.15	Changed: F38, Country Configuration, 6 is now Netherlands
	7.15	Added: F41.05-08 Pulse output (e.g.Vaporix vap control system)
	7.15	Added: F41.09 Extra maintenance key (U.K. request)
	7.15	Changed: F42, GHM rotation (exchange meter only)
	7.15	Added: F43, Motor feedback indication
	7.15	Added: F70, Access level configuration
	7.15	Added: S27.31-38, WIP pulse errors indication S27.41-48, WIP back pulses indication

1.3	7.15	Revised, F14.07/08, F20, F26.02/03, F38, F70
1.4	7.16	Added: F27/28.01, cash button assignment Changed: error level 54 classification changed from A to B
1.5	7.17	Added: F10/11.8N, maximum volume limit Added: F10/11.9N, grade code assignment Added: F22.04, Money rounding method Revised: F37.04, text for function Enhanced: S27, from 8 to 12 meters Revised: Maintenance Mode Display, chapt. 3.4, money display = current transaction side B, volume display = current transaction side A. Revised: chapt. 3.9 Statistics list Revised: error/event types, test error 36
1.6	7.19	Document revised to new template format Added: Introduction of pump model "PUMP MODEL 59, C11-11 S160 SAT": Added: Descriptions of LPG-configuration (F08/09.1N = 3) Enable to always enter FILLING COMPLETED on nozzle in (F20.03) Preset softKey#5 in F24 Pump Motor Feedback Calibration when two meters are assigned to one nozzle Pumping unit flow lost check to avoid dry operation when two meters are assigned to one nozzle Readout of Totalizers/Totals in Weights and Measures Mode Bootstrapp Download PC (Notebook) to iGEM Board (pump) Bootstrapp Download, iGEM Master (supporter Kid) to iGEM Board in pump Function 98 Download PC (Notebook) to iGEM Board Function 98 iGEM Master to iGEM Board (pump) Changed: Swapped sub functions F10/11.08 and F10/11.09. Grade number is now function F10/11.08 and individual nozzle limit is function F10/11.09.
1.7	7.19	Adjusted version number of document to this table + Added grade code description for DART (F10/11.8N) Added description of how to Strap HW for Ferranti/US Current Loop in F20
1.8	7.19	Added LPG Nozzle timeout description F23.07 Corrected release overview table, date was in, wrong order

1.9	7.20	Added:
		F26.04 Vapor recovery monitoring (Fafnir Vaporix) configuration
		Vapor recovery monitoring error/event codes 37-40
		F20.04 Use logical nozzle Totals/Totalisers Statistics as grade Totals/Totalisers Statistics
2.0	7.21	The classification of error code 41 and 47 were changed

Release overview:

Release	Date (MMDDYY)	Program checksum P-xxxx
7.13	11.08.01	b912
7.15	21.05.02	cd5A
7.16	01.07.02	2232
7.17	09.11.02	5E15
7.18	09.26.02	45B0
7.19	01.21.03	175F
7.20	03.26.03	A5EE
7.21	27.03.03	B42E

Not rel. = not released

2 Maintenance Mode Overview

2.1 General Description

You will need to access the maintenance mode in order to program functions and/or view statistics. This section explains the two ways that you can enter the maintenance mode as well as the tasks you can perform while in the maintenance mode. The function and statistics data appear in the money, volume, and unit price display windows.

2.1.1 Accessing the Maintenance Mode

Access the Maintenance Mode through one of the following interfaces:

- Service Terminal Program (STP)
- Infrared Interface

2.1.2 Performing Tasks Through the Maintenance Mode

Perform the following IGEM Operations through the Maintenance Mode:

- Configuration set-up and statistics viewing
- Diagnostics
- Remote download and upload of program code

2.2 Service Terminal Program STP

Use a laptop computer (PC) to access dispenser functions, statistics, and diagnostics. This interface can also be used to download and upload the software. The communication is through a serial link. Although you perform the programming through the pump display, a description of the various functions and statistics appear on the laptop display.

2.3 Software Loading

The Software can either be loaded by a laptop (PC) as described above or by an another IGEM computer board. The communication is through the serial link. The software is loaded from the IGEM board (master) to the IGEM board in the pump.

2.4 Infrared Interface

The infrared interface has 16 buttons. Use the infrared interface to access dispenser functions and diagnostics. This interface uses only the pump display for user feedback. There is no additional display.

3 Programming IGEM

3.1 Introduction

This section discusses how to enter the maintenance mode and what functions are available for IGEM programming.

3.2 Infrared Interface

The infrared device communicates with the IGEM via an infrared link. Access the maintenance mode by pressing the CRC-push button on the computer board, upon this the program CRC values are indicated at the display. After the CRC values are cleared, press one of the following keys within 20 sec.:

ENTER Field service engineer entry using field engineer password

1. Station manager entry using station manager password
2. Operator entry using operator password
3. Read program CRC checksums

CLEAR Weights and Measures entry using weights and measures password

The maintenance mode asks you for a password twice before allowing access to the maintenance mode functions and statistics. A 10 second time-out is built into the password entry code. When the word PASS 1 appears on the sale display, you have 10 seconds to start entering the password. The timer restarts after you press a key. When you finish entering the password and press ENTER, PASS 2 appears in the sale display window, prompting you to enter the password again.

3.3 Service Terminal Program STP

If you are a field service engineer, you can use a laptop computer to run the service terminal program (STP). To run the STP, perform the following steps:

Remove the dispenser bezel.

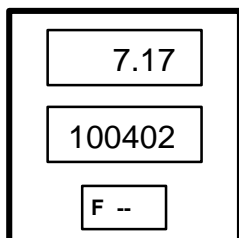
1. Connect the serial data cable to the serial channel of the laptop and the serial channel on the computer board. Make sure that the straps to select the link type are set correctly.
2. Start the STP to put the dispenser into maintenance mode.
3. Establish the communication by pressing the CRC-button on the computer board.

You must enter your password twice to access the maintenance mode functions and statistics. When PASS 1 appears on the sale display, enter the field service engineer password and press ENTER. When PASS 2 appears in the sale display window, enter the password again, then press ENTER.

3.4 Maintenance Mode Display

When you enter the maintenance mode, the unit price display windows show "F - -", the money display window shows the software version number, and the volume display window shows the date of the software version. This is the start of the function programming mode.

To edit or view specific functions, enter any function number using the number keys and press ENTER. The corresponding number appears in the money display window.

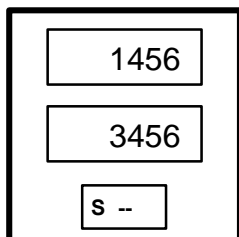


Software Version or Release number, (i.e. 7.17)

Date (MMDDYY, i.e. 04. April 2002)

To enter the statistics viewing mode press either the UP or DOWN arrow when the unit price is displaying "F - -". When you enter the statistics viewing mode, the unit price display window shows "S - -", the money display window shows the current transaction count for side B, and the volume display window shows the current transaction count for side A.

To view specific statistics, enter any statistic number using the number keys and press ENTER. The corresponding number shows in the money display window.



i.e. 1456 fillings on side B

i.e. 3456 fillings on side A

3.5 Maintenance Mode Exit

There are two ways that you can exit the maintenance mode:

- Exit and Save Changes
- Quick Exit

3.5.1 Exit and Save Changes

Use Function 00 - Exit Function to exit the maintenance mode and save changes. When you are in the function, Enter 3 for the sub function, then press ENTER twice. See F00 - Exit Function for more information on the Exit Function. If you entered maintenance mode using the infrared interface, the maintenance mode becomes inactive. If you entered maintenance mode using the Service Terminal Program, the maintenance becomes idle, but will still be active until you remove the cable from the interface or terminate the Service Terminal Program.

3.5.2 Quick Exit

If you use a Quick Exit, you will lose changes you have made. To perform a Quick Exit, do the following:

- If you used the Service Terminal Program to enter the maintenance mode, deactivate the maintenance mode by removing the cable from the RS232 interface or terminate the Service Terminal Program.
- If you used the Infrared Interface, press the CLEAR key until the unit price display windows shows "F - - " or "S - -". Then press ENTER three times. This causes the maintenance mode task to immediately terminate.

3.6 Function or Statistic Entry Level

You must access all function and statistic data through sublevels before you can view or write any data. The initial display shows dashes on the money display, the volume display is blank, and the unit price display shows the function or statistic number. The function or statistic number is preceded by an F or an S. Functionality for this screen is defined as follows:

CLEAR	Returns control to initial screen.
ENTER	Opens the first sublevel to which you have access.
UP	Advances to the next function or statistic.
DOWN	Returns to the previous function or statistic.
#	Ignored.
NEXT	Advances to the next function or statistic.
NUMBER	(1-9) Goes to function or statistic number entered. If the number is beyond the range of the available functions or statistics, the maximum function or statistic is used.

When you begin to enter numbers, the non-numeric keys have the following functionality:

CLEAR	Backspace key if there is numeric input, otherwise returns control to initial screen.
ENTER	Accepts any numeric input already entered, otherwise opens the first sublevel to which you have access.
UP	Ignored when numeric input has been entered, otherwise advances to next function or statistic.
DOWN	Ignored when numeric input has been entered, otherwise returns to previous function or statistic.
#	Ignored.
NEXT	Ignored when numeric input has been entered, otherwise advances to next function or statistic.

If you press the CLEAR key before you enter numeric data, the system will not accept the numeric data, because it has returned to the initial screen.

3.7 Sub Entry Level

When you enter the sub entry level, the unit price display shows the function/statistic number in the two left-most digits and the sub level number in the two right-most digits separated with a decimal point. The F or S no longer appear. The following list shows functionality provided at this level. Not all functionality is available depending on user access.

CLEAR	Returns control to the function or statistic entry level screen.
ENTER	Returns control to the function or statistic entry level screen.
UP	Increases the value of the displayed parameter; value rolls over when the maximum value is reached.
DOWN	Decreases the value of the displayed parameter; value rolls over when the minimum value is reached.
#	Clears the money display and allows you to enter a new value for the given parameter. Out of range values are ignored.
NEXT	Advances to the next sub function or sub-statistic within the current function or statistic.

If you enter numeric data without first pressing the # key, the system goes to the sub function or sub-statistic of the corresponding number that you entered. If the number is beyond the range of available sub-functions or sub-statistics, the maximum sub function or sub-statistic is used.

When you begin to enter numbers (preceded by the # key or not), the non-numeric keys have the following functionality.

CLEAR	Backspace key if there is numeric input, otherwise returns control to initial screen.
ENTER	Accepts any numeric input already entered.
UP	Ignored when numeric input has been entered, otherwise returns control to the sub entry level.
DOWN	Ignored when numeric input has been entered, otherwise returns control to the sub entry level.
#	Ignored when numeric input has been entered, otherwise returns control to sub entry level.
NEXT	Ignored when numeric input has been entered, otherwise returns control to the sub entry level.

3.8 Function List

The software controls access to functions and sub-functions. It contains an access level table that determines what functions each user has access to. Access levels are as follows:

- Read and Write
- Read only
- No access

3.8.1 F00 - Exit Function

Use this function to select one of three maintenance mode exits.

Sub-function numbers are in the format '.0X' where X = the selected configuration parameters defined as follows:

- .00 Exit Option, 1 through 4
 - 1 = Do not exit and do not save changes
 - 2 = Exit, but do not save changes
 - 3 = Exit and save changes
 - 4 = Soft cold-start, PASS appears in the money display, enter Password and ENTER to get the cold-startexecuted

3.8.2 F01 - Filling Modes

Sub-function numbers are in the format `.0X' where X = the selected configuration parameters defined as follows:

.00 Filling Mode, 1 through 4

1 = Serial Mode, dispenser controlled by site controller via serial link

2 = Stand Alone Mode, dispenser not supervised by a site controller

3 = Serial W&M Mode, same as #1 but volume decimal point format forced to .xxx volume units

4 = Stand Alone W&M Mode, same as #2 but volume decimal point format forced to .xxx units

3.8.3 F02 - Clock Configuration

Sub-function numbers are in the format `.0X' where X = the selected configuration parameters defined as follows:

.00 Not used (Time in the format HH.MM)

.01 Not used (Date in the format MM.DD)

.02 Not used (Year in the format YY.YY)

3.8.4 F03 - Set Side A Unit Prices

These functions are not part of the template data.

Sub-function numbers are in the format:

.0N Set credit prices

.1N Not used (Set cash prices)

N Logical nozzle number 1-4 (5-8 optional)

3.8.5 F04 - Set Side B Unit Prices

These functions are not part of the template data.

Sub-function numbers are in the format:

.0N Set credit prices

.1N Not used (Set cash prices)

N Logical nozzle number 1-4 (5-8 optional)

3.8.6 F05 - Set Side A Fuelling Point Address

.00 Fuelling Point Address, 0 through 99, where 0 = None Assigned

3.8.7 F06 - Set Side B Fuelling Point Address

.00 Fuelling Point Address, 0 through 99, where 0 = None Assigned

3.8.8 F07 - Dispenser Configuration

Sub-function numbers are in the format '.0X' where X = the selected configuration parameters defined as follows:

- .00 Maximum logical nozzle number for each side, 1-4 (5-8 optional), read only see F37.01
- .01 Dispenser geometry, 1 = single sided, 2 = double sided, read only see F37.02
- .02 Maximum blend error allowed, 1-5 (units of %)
- .03 First check set for blending if litres, 2-200 (units of 1/10 Litres)
- .04 First check set for blending if gallons, 5-50 (units of 1/10 Gallons)
- .05 Number of Dispenser Displays per side
 - 0 = one Display per side
 - 1 = second Display on side A
 - 2 = second Display on side B
 - 3 = second Display on side A and side B
- .06 Wayne Integrated Pulser (WIP) Type
 - 1 = serial WIP
- .07 Stop button configuration
 - 1 = Stop Both Sides
 - 2 = Stop Side
- .08 Stop button assignment
 - 0 = Stop Button input on display membrane (preset) keyboard disabled (but remains on original stop button input display connector J4)
 - 1 – 24 = used button number on display membrane keyboard input

3.8.9 F08- Side A Dispenser Type Configuration Part #1

Sub-function numbers are in the format: '.XN' where X = the selected configuration parameters and

N = the logical nozzle number 1-4 (5-8 optional) as follows:

- .0N Physical nozzle number assignment, 0-4,
 - 0 = None, (5-8 optional)
- .1N Product type assignment, 1-3,
 - 1 = Normal + high-speed
 - 2 = blend
 - 3 = LPG
- .2N Unit Price display assignment, 0-4,
 - 0 = None, (5-8 optional)
- .3N Primary meter number assignment, 0-8,
 - 0 = None, (9-16 optional)
- .4N Secondary meter number assignment, 0-8,
 - 0 = None, (9-16 optional)
- .5N Primary valve number assignment 0-10,
 - 0 = None, (11-16 optional)
- .6N Primary valve type, 1-3
 - 1 = ASCO On/Off
 - 2 = Skinner Prop. (Not used)
 - 3 = ASCO Proportional
- .7N Secondary valve number assignment, 0-10,
 - 0 = None, (11-16 optional)
- .8N Secondary valve type, 1-3,
 - (refer to .6N prim. valve type)

- .9N Third valve number assignment, 0-10,
0 = None, ASCO on/off only

3.8.10 F09 - Side B Dispenser Type Configuration Part #1

This function provides the same functionality on side B as F08

3.8.11 F10 - Side A Dispenser type Configuration Part #2

Sub-function numbers are in the format: '.XN' where X = the selected configuration parameters and N = the logical nozzle number 1-4 (5-8 optional).

- .0N Octane number, 00-99,
00 = None assigned
- .1N Product select button input number, 1-24,
0 = None assigned
- .2N Push-to-Start button input number, 1-24,
0 = None assigned
- .3N Vapour recovery system enabled,
1 = Yes,
2 = No
- .4N Beep annunciation in a series of six beeps on physical nozzle lift,
1 = Yes,
2 = No
- .5N High/Low flow (80/40l/min) capacity Toggle between flow at F29/30.2x and F29/30.3x
1-24,
0 = None assigned
- .6N High capacity button assignment 1-24,
(iGEM keyboard = 10)
Flow at F29/30.3x
0 = None assigned
- .7N Low capacity button assignment 1-24,
(iGEM keyboard = 9)
Flow at F29/30.2x
0 = None assigned
- .8N Grade code assignment (0 - 9),
0 = grade code as Log. Nozzle no.
possible grade codes for Ferranti CL 0 - 9
possible grade codes for LJCL, 1 - 5,
where 1 = grade 0 etc,
0 = not assigned
possible grade codes for DART 1 - 7
- .9N Maximum volume limit 1-6 digits 0-999999
0 = None assigned

3.8.12 F11 - Side B Dispenser Type Configuration Part #2

This function provides the same functionality on side B as F10

3.8.13 F12 - Side A Pump Assignments

Sub-function numbers are in the format: `.XN' where X = the selected configuration parameters and

N = the logical nozzle number 1-4 (5-8 optional).

.0N Primary pump assignment, 0-4, 0 = None assigned (5-8 optional)

.1N Secondary pump assignment, 0-4, 0 = None assigned (5-8 optional)

3.8.14 F13 - Side B Pump Assignments

This function provides the same functionality on side B as F12

3.8.15 F14 - Dispenser Display Configuration (both sides)

Sub-function numbers are in the format `.0X' where X = the selected configuration parameters defined as follows:

.00 Number of unit price displays per side, 0-8, 0 = None supported

.01 Display mode after sale paid

1 = Money is actual, volume is actual, unit price is actual

2 = Money is zeros, volume is zeros, unit price is actual

3 = Money is zeros, volume is zeros, unit price is blanks

4 = Money and Volume actual, Unit Price blank

5 = Money is actual, volume is actual, unit price is for 5sec. actual

.02 Money display digits right of decimal point, 0-4

.03 Volume display digits right of decimal point, 0-4

.04 Unit Price display digits right of decimal point, 0-4 (used as base for the money calculation)

.05 Flash unit price display when selected after 8 - blanks - 0

1 = No Flash,

2 = Flash until flow

3 = flash always

.06 Suppress display of leading zeros in normal mode

1 = Yes

2 = No

.07 Totals and totalizer amount display digits right of the decimal point, 0-4 (effects DART and LJCL totals)

.08 Totals and totalizer volume display digits right of the decimal point, 0-4 (effects DART and LJCL totals)

.09 Unit Price display decimal point indication digits right of decimal point, 0-4, 5 = disabled = use setting in 14.04. (to be used only when the indicated decimal point should differ from the setting in F14.04display). Germany = 1.

3.8.16 F15 - Dispenser Annunciator Configuration

Sub-function numbers are in the format `.0X' where X = the selected configuration parameters defined as follows:

.00 Beep annunciator on any button push

1 = Yes

2 = No

- .01 Beep annunciator on physical nozzle lift
 - 1 = Yes
 - 2 = No
- .02 Repeat annunciator beep if physical nozzle out and Push-to-start (or grade select) NOT satisfied
 - 1 = Yes
 - 2 = No
- .03 Beep annunciator once for each eight's, blanks, and zeros
 - 1 = Yes
 - 2 = No

3.8.17 F16 - WIP Configuration

Sub-function numbers are in the format `.0X' where X = the selected configuration parameters defined as follows:

- .00 Measurement mode
 - 1 = Litres
 - 2 = Gallons
 - 3 = Imperial Gallons
- .01 WIP reverse pulse hysteresis, 1-64
- .02 Confirm WIP serial number change (when WIP has been replaced)
 - 0 = Serial number stored
 - 1 = Confirm new serial WIP numbers (needs to be done when WIP has been replaced and F16.04=1, this parameter will be automatically reset when Maintenance Mode is exited and new serial number is stored)
- .03 Reverse pulse Limit (after hysteresis) on an idle/unused WIP 1-255
- .04 Verify WIP serial number change
 - 0 = disabled
 - 1 = enabled

3.8.18 F17 - Dispenser Limits Configuration

Sub-function numbers are in the format `.0X' where X = the selected configuration parameters defined as follows:

- .00 Maximum number of pulse errors on an "in use" WIP (in a transaction), 1-99
- .01 Maximum number of pulse errors on an idle/unused WIP, 1-99
- .02 Maximum number of display errors/filling, 0-99, where 0 = disabled
- .03 Stop for "no flow" or "flow lost" time limit (0 - 1000 seconds)
- .04 Maximum number of consecutive no flow events w/out error, 0-10, 0 = disabled
- .05 Maximum number of flow lost events w/out error, 0-10, 0 = disabled
- .06 Maximum number of unfinished fillings, 0-10, 0 = Feature disabled
- .07 Maximum filling amount/filling, 1-6 digits
- .08 Maximum volume amount/filling, 1-6 digits

3.8.19 F18 - Blend Ratio Configuration

Sub-function numbers are in the format: `SN' where S = the Side number (1=A, 2=B) and N = the logical nozzle number 1-4 (5-8 optional).

SN. Blend ratio (the allowed range for data is 0-101)

100 = primary valve only, secondary valve closed

0 = secondary valve only, primary valve closed

101 = primary and secondary valve assignment (high capacity pumps 130 l/m)

3.8.20 F19 - Volume Unit Specific Configuration

Sub-function numbers in the format `VX' where V= volume unit selection (1= litres, 2=gallons) and X = the selected configuration parameters defined as follows.

.10 Suppressed volume @ start of filling, 0-9 cl.

.11 Maximum volume for selection of new product, 1-9 cl.

.12 Suppress overflow of preset limit, 0-99 cl.

.13 Preset/Prepay slow down volume delta. 5-399 cl.

.14 Forward pulse limit on idle/unused WIP. 1-99 cl.

.15 Second Clear volume limit 0-15 cl, 0 = disabled.

.16 Hose test volume, 0-25 cl, 0 = disabled. (Set time in F23.06)

.20 Suppressed volume @ start of filling, 1-99 (units of 1/1000 Gallons)

.21 Maximum volume for selection of new product, 1-99 (units of 1/1000 Gallons)

.22 Suppress overflow of preset limit, 0-99 (units of 1/1000 Gallons)

.23 Preset/Prepay slow down volume delta. 2-999 (units of 1/1000 Gallons)

.24 Forward pulse limit on idle/unused WIP. 1-999 (units of 1/1000 Gallons)

.25 Second Clear volume limit 0-4 cg, 0 = disabled.

.26 Hose test volume (Set time in F23.06), 0-65 cg, 0 = disabled.

3.8.21 F20 - Dispenser Serial Link Configuration

Sub-function numbers are in the format `0X' where X = the selected configuration parameters defined as follows:

.00 Protocol

0 = Off link

1 = RS485 Standard DART

2 = RS-485 FULL DART

3 = RS-485 FULL DART for IFSF LON

4 = US current loop,

5 = Ljungmans current loop

6 = Ferranti A

7 = ATCL

8 = Ferranti B

9 = Ferranti C (copos)

- .01 Baud rate (Baudrad is selected automatically by the selected protocol type above)
 - 1 = 1200
 - 2 = 2400
 - 3 = 4800
 - 4 = 9600
 - 5 = 19200
 - 6 = 38400
 - 9600 is default

Note: DART and Ljungmans current loop is approved on 9600 Baud only

- .02 Reserved
- .03 Always enter FILLING COMPLETE on nozzle return (including on grade change)
 - 1 = Yes,
 - 2 = No
- .04 Use logical nozzle Totals/Totalisers Statistics as grade Totals/Totalisers Statistics
 - 1 = Yes, statistics will be updated based on grade code assigned by F10/11.8N
 - 2 = No, statistics will be updated based logical nozzle numbers

3.8.22 F21 - Miscellaneous Configuration

Sub-function numbers are in the format '.0X' where X = the selected configuration parameters defined as follows:

- .00 Pump Motor ON configuration
 - 1 = ON at end of display test
 - 2 = ON at start of display test, to be used on dispensers (submersible operated) set delay time in F23.00
 - 3 = ON at product selection
- .01 Lock on filling mode configuration
 - 1 = Access to filling mode configuration restricted
 - 2 = Access allowed.
- .02 Standalone indication enabled (show four digits right of decimal point)
 - 1 = Yes
 - 2 = No
- .03 Blank or dash unselected unit price displays on product selection
 - 1 = Blank
 - 2 = Dash
- .04 Product change allowed after fuelling started
 - 1 = yes, product change allowed after fuelling started
 - 2 = no, product change not allowed after fuelling started
- .05 Electro-mechanical totalizer configuration and
 - 1 =One EMT per meter. EMT 1 on J6 is mapped to meter 1 and EMT5 on J7 is mapped to meter 5.

2 =One EMT per WIP/GHM. EMT 1 on J6 is mapped to WIP 1 and EMT 4 on J6 is mapped to WIP 4.

3 =One EMT per logical nozzle. EMT 1 on J6 is mapped to logical nozzle 1 on side A and EMT 5 on J7 is mapped to logical nozzle 1 on side B.

Note: Maximum 4 logical nozzle per side.

.06 Flow Rate Indication while filling at the amount display

0 = Disabled

1 = show primary volume

2 = show secondary volume

3 = show primary plus secondary volume

4 = show primary volume at the amount display and secondary volume at the unit price display

5 = same as "1", function enabled if "crc-button" is pressed before filling, flow rate indicated for 10sec. if button "7" is pressed while filling

6 = same as "2", function enabled if "crc-button" is pressed before filling, flow rate indicated for 10sec. if button "7" is pressed while filling

7 = same as "3", function enabled if "crc-button" is pressed before filling, flow rate indicated for 10sec. if button "7" is pressed while filling

8 = same as "4", function enabled if "crc-button" is pressed before filling, flow rate indicated for 10sec. if button "7" is pressed while filling

.07 Error/Event indication at the pump display

0 = **flash display** and **show "CLOSED"** from error **level C**

1 = **flash display only** from error **level B**

2 = **flash display, show "CLOSED"** and **show the error code** on the unit price display from error **level C**

3 = **flash display** and **show the error code** on the unit price display from error **level B**

.08 Weight and Measures Totalizer or Totals indication at the pump display and transmission to the site controller (activated by Remote Control CLEAR button)

0 = Totalizer per meter

1 = Totalizer per logical nozzle

2 = Totals per meter

3 = Totals per logical nozzle

.09 Maintenance Mode access through Remote Control without pressing the CRC button on the IGEM computer first

0 = entry possible at all levels

1 = entry with button 1, 2, 3, CLEAR. But not ENTER CRC button needs to be pressed first

2 = entry with button 3, CLEAR. But not ENTER, 1, 2 CRC button needs to be pressed first

3 = entry with button 3 and CLEAR. But not ENTER, 1, 2, CRC button needs to be pressed first

4 = no entry without pressing the button first

3.8.23 F22 - Sales Amount Calculation

Sub-function numbers are in the format '.0X' where X = the selected configuration parameters defined as follows:

- .00 Denomination ratio between Money display and Unit Price display
 - 1 = 1/1 (money = 1 x unit price)
 - 2 = 10/1 (money = 10 x unit price)
 - 3 = 100/1 (money = 100 x unit price)
 - 4 = 1/10 (money = unit price / 10)
 - 5 = 1/100 (money = unit price / 100)
 - 6 = 1/1000 (money = unit price / 1000)
- .01 Count by ones or fives in least significant digit of Money display
 - 1 = Ones
 - 2 = Fives
- .02 Volume digits to the right of the decimal point used in amount calculation 0-5, where 5 = use volume decimal point as defined in function 14.03.
- .03 Money preset configuration. As the unit price increases, the system reaches a point when certain preset money amounts cannot be set due to the resolution of the metering system and/or the configured resolution of the volume used for the money calculation. Program this sub-function to give the desired result when this occurs.
 - 0 = Calculate the closest volume from the money and the unit price and show the actual money amount at the end of the sale.
 - 1 = Calculate the closest volume from the money and the unit price but show the preset money amount at the end of sale as long as the sale hasn't reached the maximum overrun volume.
 - 2 = Calculate a volume amount that will ensure a money amount that is greater than or equal to the preset amount and show the preset money amount at the end of the sale as long as the sale hasn't reach the maximum overrun volume (recommended).
- .04 Money rounding method
 - 0 = money value is rounded up, if rounding digit is greater or equal to 5 (i.e. 21,2350 -> 21,24)
 - 1 = round to even, money value is rounded up only if value is odd and rounding digit is greater or equal to 5. (i.e. 21,2350 -> 21,24, 21,2450 -> 21,24)

3.8.24 F23 - Miscellaneous Timers

Sub-function numbers are in the format '.0X' where X = the selected configuration parameters defined as follows:

- .00 Display test time (total test time - also known as valve on delay time for dispensers – submersible operated), 2-24 (units of 1/2 Sec)
- .01 Minimum time between fillings, 0-20 (units of 1/2 Sec), where 0 = disabled
- .02 Stop for offline error, 0-30 (seconds), where 0 = disabled
- .03 Maximum time allowed for filling, 0-60 (minutes), where 0 = disabled
- .04 Time from unit price change until next start of sale, 0-15 (seconds)

- .05 High/Low flow (80/40l/min) capacity and Master/Satellite selection timeout
- .06 Hose test time, 0-9 (units of 1/2 Sec.),
where 0 = disabled, 11-19 (units of 1/2 Sec.), controlled by Logitron system
- .07. LPG nozzle timeout (units of secs) 1 - 15
used when valve type assigned by F08/09.1N = 3 = LPG

3.8.25 F24 - Local Preset Configuration

Sub-function numbers are in the format '.0X' where X = the selected configuration parameters defined as follows:

- .00 Operation Mode
 - 1 = Money amount only entry
 - 2 = Volume amount only entry
 - 3 = Default to money, toggle by button
 - 4 = Default to volume, toggle by button
- .01 Preset entry required before filling start
 - 1 = Yes
 - 2 = No
- .02 Preset Keyboard type and US preset fill mode display
 - 0 = preset disabled, the buttons are used for other appl.s (f. e. Prod. select on a Single hose pump)
 - 1 = 5 button preset keyboard, displaying blanks (" ")
 - 2 = 12 button preset keyboard, displaying blanks (" ")-(button 6= soft key 1, button 12= soft key 2)
 - 3 = 5 button preset keyboard, displaying dashes ("-----")
 - 4 = 12 button preset keyboard, displaying dashes ("-----")
 - 5 = 5 button preset keyboard, displaying fill ("FILL")
 - 6 = 12 button preset keyboard, displaying fill ("FILL")
 - 7 = 5 button preset keyboard, displaying preset ("PRESET")
 - 8 = 12 button preset keyboard, displaying preset ("PRESEt")
 - 9 = 5 button preset keyboard, ARAL application, preset value is not indicated at the display, instead a LED beside the preset button is lit for identification,
- .03 Preset entry time-out, 0-60 (units of seconds)
- .04 Soft key #1 function configuration, 0-9
 - 0 = Disabled
 - 1 = Select Money Pre-set
 - 2 = Select Volume Pre-set
 - 3 = Toggle between Money or Volume Pre-set
 - 4 = Select FILL Mode
 - 5 = Select Pre-set Value #1
 - 6 = Select Pre-set Value #2

- 7 = Select Pre-set Value #3
- 8 = Clear Key
- 9 = Enter Key
- 10 = Select Pre-set Value #4
- .05 Soft key #2 function configuration, 0-10 (See .04 for definitions of configuration items.)
- .06 Soft key #3 function configuration, 0-10 (See .04 for definitions of configuration items.)
- .07 Soft key #4 function configuration,.0-10 (See .04 for definitions of configuration items.)
- .08 Soft key #5 function configuration,.0-10
(See .04 for definitions of configuration items.)
- .09 First display digit entry point for money preset, 1-6
- .10 First display digit entry point for volume preset, 1-6

3.8.26 F25 - Local Preset By Button Configuration

Sub-function numbers are in the format '.0X' where X = the selected configuration parameters defined as follows:

- .00 Preset value #1 operation mode
 - 1 = Money
 - 2 = Volume
- .01 Preset value #2 operation mode
 - 1 = Money
 - 2 = Volume
- .02 Preset value #3 operation mode
 - 1 = Money
 - 2 = Volume
- .03 Preset value #4 operation mode
 - 1 = Money
 - 2 = Volume
- .04 Preset value #1 money/volume limit, 0-999999
- .05 Preset value #2 money/volume limit, 0-999999
- .06 Preset value #3 money/volume limit, 0-999999
- .07 Preset value #4 money/volume limit, 0-999999

3.8.27 F26 - VAP Configuration

Sub-function numbers are in the format '.0X' where X = the selected configuration parameters defined as follows:

- .00 Buerkert vapour recovery control
 - 0 = Disabled
 - 1 = Generate pulses l/min (no nozzle information)
 - 2 = Generate pulses l/min and nozzle information

- .01 Manual Calibration without the Buerkert Handterminal
0 = Disabled
1 = Enabled (Swedish Application)
- .02 K-factor 1 (V/L) used for manual calibration. Default = 107 (Burkert + ASF Pump)
- .03 K-factor 2 (general) used for manual calibration. Can be used to adjust the overall vapor regulation.
Default = 100.
- .04 Vapor recovery monitoring (Fafnir Vaporix) configuration.
0 = Disabled
1 = Enabled, show monitorings errors on pump display only
(connect Vaporix System to expansion inteface pulse and error signals)
2 = Enabled, show monitorings errors on pump display and transmit via DART to system
Attention, make sure that System has been loaded with specific Software Version to handle the DART Alarmcodes.

3.8.28 F27 - Side A Dispenser Configuration

- .00 Button input for local authorise function, 0-24, where 0 = not supported
- .01 Cash button assignment, 0-24, where 0 = not supported

3.8.29 F28 - Side B Dispenser Configuration

- .00 Button input for local authorise function, 0-24, where 0 = not supported
- .01 Cash button assignment, 0-24, where 0 = not supported

3.8.30 F29 - Side A Litre Flow Rate Configuration

- .0N Maximum slow flow rate, 3-50 (units of 1/10 litres/min.)
- .1N Minimum slow flow rate, 0-50 (units of 1/10 litres/min.), 0 = no minimum
- .2N Maximum fast flow rate, 10-180 (units of litres/min.)
- .3N Maximum full flow rate (to be used for flow selection by button -40/80 l/min.), 10-180 (units of litres/min.)
- N Logical nozzle

3.8.31 F30 - Side B Litre Flow Rate Configuration

This function provides the same functionality on side B as F29

3.8.32 F31 - Side A Gallon Flow Rate Configuration

- .0N Maximum slow flow rate, 1-10 (units of 1/10 Gallons/min.)
- .1N Minimum slow flow rate, 0-10 (units of 1/10 Gallons/min.), 0 = no minimum
- .2N Maximum fast flow rate, 3-48 (units of Gallons/min.)
- .3N Maximum full flow rate (to be used for flow selection by button -10/20 Gallons/min.), 0-48 (units of Gallons/min.)
- N Logical nozzle

3.8.33 F32 - Side B Gallon Flow Rate Configuration

This function provides the same functionality on side B as F31

3.8.34 F33 - Password Change

Dashes appear in the money display window, and the word PASS appears on the volume display. When you begin editing, the money display goes blank and dashes appear instead of the regular entries. Enter the new password twice. The sub-function numbers are defined as follows:

- .00 Service Engineer Password, maximum of 6 characters (Use numbers only)
- .01 Station Manager Password, maximum of 6 characters (Use numbers only)
- .02 Station Operator Password, maximum of 6 characters (Use numbers only)
- .03 Weights and Measures Password, maximum of 6 characters (Use numbers only)

3.8.35 F34 - Diagnostics

These functions provide a way to test various parts of the hardware, including all switches, displays, beeper and vapour recovery. Other motors and valves are not available for security and safety reasons. When a test is invoked, press CLEAR or ENTER to end the test.

- .01 Switch test. The money display shows 4 dashes until a switch is activated. A description of the activated switch and side (1 or 2) is displayed on the money display. For example, nozzle switch 3 on side 2 is displayed as 2n3 as long as the switch is depressed (n = nozzle, S = Stop switch, b = bitbus e.g. preset, high/low flow, satellite buttons,). When the nozzle is deactivated the display reverts to dashes.
- .02 Display test . A "walking segment" test is performed in which each segment of the display is turned on and off. Each digit of the display is tested at the same time.
- .03 Vapour Recovery subsystem test, Side A
- .04 Vapour Recovery subsystem test, Side B

These sub-functions simulate a flow rate to the vapour recovery system, which turns on the recovery motor accordingly. Lift the nozzle on the specified side to start the test. The volume display shows the simulated flow rate. The UP key increases the simulated flow rate. The DOWN key decreases the flow rate in steps of 1l/min.

3.8.36 F35 = Side A Satellite Configuration

Sub-function numbers in the format '.XN' where N = the logical nozzle number 1-4 (5-8 optional) and X = the selected configuration parameters defined as follows:

- .00 Satellite Nozzle (logical nozzle no. 0-4 (5-8 optional),
0 = None assigned).
- .01 Master Nozzle (logical nozzle no. 0-4 (5-8 optional),
0 = None assigned).

Both SAT and Master nozzle has to be assigned on SAT pump

- .02 Satellite Enable Button (Button no. 0→24,
0 = None assigned).

- .03 Master Enable Button (Button no. 0→24,
0 = None assigned).

If no button is assigned, flow will be re-directed within the timeout F23.05 based on nozzle lift/returned.

- .04 Satellite behaviour
0 = Limited (can't start on SAT nozzle, no dual nozzle filling e t c).
1 = Can not start on satellite, dual and sequential filling possible
2 = Full (any combinations).
- .05 Single Meter SAT, (one meter with duplex valve 1 and 9)
0 = Disabled.
1 = Enabled.

3.8.37 F36 = Side B Satellite Configuration

This function provides the same functionality on side B as F35

3.8.38 F37 - Pump Model Configuration

Setting the pump model number will write the default values specified for the specific model. Default values will always be written to F07, 08, 09, 10, 11, 12, 13, 18, 29, 30, 31, 32, 35, and 36.

Make sure that you always select the pump model number first before setting a specific function.

Any change to the model number will overwrite previous settings of the above Function registers!

Enter pump model number (01-99) to be configured:

- .00 model number
see pump model description
- .01 Maximum logical nozzle number for each side, 1-4 (5-8 optional),
- .02 Dispenser geometry, 1 = single sided, 2 = double sided,
- .03 General valve type for all primary, secondary and third valves, 1-3
0 = Disabled
1 = ASCO On/Off
2 = Skinner Proportional Not used
3 = ASCO Proportional
- .04 UPD re-orientation, side A, (inverts selected orientation for)
0 = Disabled
1 = side A
2 = side B
3 = side A+B

- .05 UPD mapping
 - 0 = Disabled
 - 1 = map all UPD to second UPD panel
 - 2 = map 1st UPD to UPD panel 2 and 2nd on panel 3 (when a 4 UP Display is used in a 4/2 pump)
 - 3 = map 1st UPD to UPD panel 1 and 2nd on panel 3 (when a 3 UP Display is used in a 4/2 pump)

3.8.39 F39 – Error level assignment

- .00 - .99 restricted for the vapour recovery error levels only (42, 43, 44, 45, 46, 47)
 - 0 = LOG
 - 1 = Termination, terminate filling
 - 2 = SEMI Fatal, close current dispenser side
 - 3 = Fully Fatal, close both dispenser sides

3.8.40 F40 – Manual VAP calibration without the Buerkert Handterminal

See manual VAP description

3.8.41 F41 – Backlight, Red/Green outputs, Spare In/Outputs assignment

- .01 side A backlight functionality
 - 0 = disabled
 - 1 = backlight on in all dispenser states except closed, off when in closed state
- .02 side B backlight functionality
 - This function provides the same functionality on side B as 01
- .03 side A Red/Green functionality
 - 0 = disabled
 - 1 = Green lamp application, lamp OFF when nozzle replaced until cashed, otherwise ON
 - 2 = Red lamp application 1, Idle state = OFF, nozzle out = OFF, volume > suppressed volume = OFF, nozzle in = ON, filling cashed = OFF
 - 3 = Red lamp application 2, Idle state = OFF, nozzle out = OFF, volume > suppressed volume = ON, nozzle in = FLASHING, filling cashed = OFF
 - 4 = Video output
- .04 side B Red/Green functionality
 - This function provides the same functionality on side B as 03
- .05 Spare Out 1 functionality
 - Pulse output side A
 - 0 = disabled
 - 1 = Vaporix control (no pulses if vapour recovery is disabled)
 - 2 = Pulse output (pulse output always enabled)
 - 5 = Speaker Relay Control

- .06 Spare Out 2 functionality
Pulse output side B
0 = disabled
1 = Vaporix control (no pulses if vapour recovery is disabled)
2 = Pulse output (pulse output always enabled)
- .07 Spare Out 3 functionality
Pulse output side A
0 = disabled
1 = Vaporix control (no pulses if vapour recovery is disabled)
2 = Pulse output (pulse output always enabled)
- .08 Spare Out 4 functionality
Pulse output side B
0 = disabled
1 = Vaporix control (no pulses if vapour recovery is disabled)
2 = Pulse output (pulse output always enabled)
- .09 Spare In 1 functionality
Maintenance key configuration
0 = not assigned
1 = not defined
2 = not defined
3 = not defined
4 = Maintenance key is enabled (connector J12 pin 1+2)
- .10 Spare In 2 functionality
0 = not assigned
1 = not defined

3.8.42 F42 – GHM rotation

- .01 GHM 1, exchange meter assignment
0 = disabled
1 = exchange
- .02 GHM 2, exchange meter assignment
0 = disabled
1 = exchange
- .03 GHM 3, exchange meter assignment
0 = disabled
1 = exchange
- .04 GHM 4, exchange meter assignment
0 = disabled
1 = exchange

- .05 GHM 5, exchange meter assignment, reserved
0 = disabled
1 = exchange
- .06 GHM 6, exchange meter assignment, reserved
0 = disabled
1 = exchange

3.8.43 F43 - Motor feedback

- .00 0 = Motor feedback disabled for all motors
1 = Motor feedback enabled for all motors
- .01 Error is indicated
Motor 1 = value 1
Motor 2 = value 2
Motor 3 = value 4
Motor 4 = value 8
For example :
If no motor has shut off -> F43.01 = 0
If motor 2 and 3 has shut off -> F43.01 = 6 (2+4)
Further fillings (which use the erroneous motor) are inhibited until "flag" is cleared in F43.01
For example :
If F43.01 = 3-> motors 1 and 2 has shut off.
If one write 1 in F43.01 only motor 1 is shut off.
If 0 (zero) is written in F43.01 then all motor errors are cleared.

3.8.44 F96 - Upload Flash Memory Programming

This function requires the service terminal, NOT the remote control.

This function has no sub-functions. Press ENTER to transmit the FLASH program data. The service terminal program requests a filename to upload the data to. Select the file to begin the program upload.

When the FLASH program upload finishes, the IGEM goes back to function entry mode where you may access other functions.

3.8.45 F98 - Download Flash Memory Programming

This function requires the laptop (PC) service terminal or an another IGEM computer, NOT the remote control.

This function has no sub-functions. Complete the following steps to use the service terminal:

- Download Laptop - iGEM:

Turn off the power to the IGEM pump computer board

Make the data cable connection laptop iGEM computer (make sure that the physical data link is set correctly)

Switch on the power to the pump computer board

Start the Service Terminal Program

Press the CRC button to establish the data communication

When communication is established, you are asked to enter the password (If this does not display, be sure the cable is connected properly and repeat the previous steps)

1. Enter PASS 1.
2. Enter PASS 2.
3. Enter "98" and "ENTER" for Function 98.
4. DOWNLOAD FLASHPROGRAM
5. NO CHANGE W&M PART
6. Press ENTER to confirm
7. ENTER PASSWORD "XY" and press ENTER (Enter Verification Code Password)
8. Select the file.
9. ENTER
10. The Service Terminal Program should request a filename to be downloaded. The Service Terminal Program will allow the user to browse the various directories for the desired file. When the file is selected, the CRC of the file is checked and if everything is OK, the program download will start. If the file cannot be found or has a bad CRC, the download will be aborted.
11. Upon completion of the download, the IGEM will go back to the function entry mode where other functions may be accessed or the Service Terminal Program can be terminated at this point and the laptop disconnected.
12. The window on the laptop screen shows "waiting for flash erase" and displays then sequentially the data blocks transmitted to the pump computer.
13. The pump computer is displaying "burn" to indicate loading of the program
14. Upon completion of the download, the IGEM will go back to the function entry mode where other functions may be accessed or the Service Terminal Program can be terminated at this point and the laptop disconnected.
15. The Service Terminal Program indicates "DOWNLOAD COMPLETE"

It is important that you do not interrupt the download for any reason. If this happens, you will have to replace the computer board. Reloading is not possible anymore.

When the download is complete, the software executes a warm start which is just like a power cycle.

If the laptop is still connected and the laptop program is still running, the IGEM will re-enter maintenance mode when you press the CRC button prompting for the passwords to be entered. At this point you can terminate the laptop program and disconnect the laptop.

It is recommended to run a "coldstart" after download.

- Download iGEM - iGEM Computer:

Definitions:

Master = iGEM computer which is connected to the iGEM computer in the pump.

Slave = iGEM computer located in the pump

Turn off the power of the Slave

Connect data cable between Master and Slave

Switch on the power of the Master and Slave

For download complete the following steps:

1. Slave: Press CRC button to get Maintenance Mode Access
2. Slave: Enter PASS 1.
3. Slave: Enter PASS 2.
4. Slave: Enter F.98 and press "ENTER" -> "PRESS" is displayed
5. Master: Press CRC button, Display shows "dload"
6. Slave: Press ENTER to confirm
7. Slave: Enter Verification Code Password "XY" and "ENTER"
Display shows "burn"
8. Master: Display shows "ERASE" and then the data blocks transmitted "Pro 01 - xy"

Switch off power when finished and disconnect cable connections.

It is important that you do not interrupt the download for any reason. If this happens, you will have to replace the computer board. Reloading is not possible anymore.

It is recommended to run a "coldstart" after download.

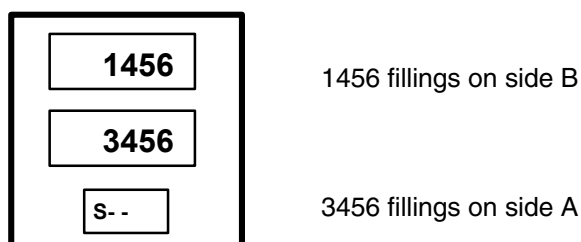
3.8.46 F99 – Not used

3.9 Statistics List

The software controls access to statistics and sub-statistics. It contains an access level table that determines what functions each user has access to. Access levels are as follows:

- Read and Write
- Read only
- No access

To **enter the statistics** viewing mode press either the **UP or DOWN arrow when the unit price is displaying "F - "**. When you enter the statistics viewing mode, the unit price display window shows "S - - ", the money display window shows the current transaction count for side B, and the volume display window shows the current transaction count for side A. To view specific statistics, enter any statistic number using the number keys and press ENTER. The corresponding number shows in the money display window.



The following is a comprehensive list of defined statistics:

Describe how to reset totals!

3.9.1 S01 - Side A Totals by Logical Nozzle

Sub-statistic numbers in the format '.TN'

T = totals type:

- 1 = Volume
- 2 = Total Money
- 3 = Credit
- 4 = Cash
- 5 = Serial Filling Mode Filling Count
- 6 = Stand Alone Mode Filling Count
- N = logical nozzle number 0-8 (0 = None Assigned)

The least significant six (6) digits of the data value appear on the volume display. Higher order non-zero digits of the data value, if present, appear on the money display. Leading zeros appear as blanks.

To reset totals:

1. Press #. Display indicates "CLEAR totALS"
2. Press "ENTER". Display indicates "PASS"
3. ENTER PASSWORD "XY" and press ENTER (Enter Verification Code Password)

3.9.2 S02 - Side B Totals by Logical Nozzle

This statistic provides the same functionality on side B as S01

3.9.3 S03 - Side A Error/Event Counter Totals

The money display is in the form of dashes and sub-statistic displays on the unit price display in the range 1-99 representing the set of error/events detectable by the program. The allowed range for the counter value is 0-255.

See Error Codes for a list of error codes.

3.9.4 S04 - Side B Error/Event Counter Totals

This statistic provides the same functionality on side B as S03

3.9.5 S05 - Side A Meter Volume Totals

Sub-statistic numbers in the format '.M0' where 'M' = meter number 1-8. The least significant six (6) digits of the data value appear on the volume display. Higher order non-zero digits of the data value, if present, appear on the Money display. Leading zeros appear as blanks.

To set totals:

1. Press #.
2. Enter desired start value.
3. Press ENTER twice.

3.9.6 S06 - Side B Meter Volume Totals

This statistic provides the same functionality on side B as S05

3.9.7 S07 - S10: RESERVED

3.9.8 S11 - Side A Totalizers by Logical Nozzle

Sub-statistic numbers in the format '.TN':

T = Totals type

- 1 = Volume
- 2 = Total Money
- 3 = Credit
- 4 = Cash
- 5 = Serial Filling Mode Filling Count
- 6 = Stand Alone Mode Filling Count

N = logical nozzle number 0-8 where 0 = None Assigned

The least significant six (6) digits of the data value appear on the volume display. Higher order non-zero digits of the data value, if present, appear on the Money display. Leading zeros appear as blanks.

3.9.9 S12 - Side B Totalizers by Logical Nozzle

This statistic provides the same functionality on side B as S11

3.9.10 S13 - Side A Error/Event Counter Totalizers

The money display shows dashes and the volume display shows the statistic data. The unit price display shows the statistic and sub-statistic numbers in the format `14.XX' where `XX' is in the range 0-99 representing the set of error/events detectable by the program. The allowed range for the counter value is 0-999.

See Error Codes for a list of error codes.

3.9.11 S14 - Side B Error/Event Counter Totalizers

This statistic provides the same functionality on side B as S13

3.9.12 S15 - Side A Meter Volume Totalizers

Sub-statistic numbers in the format 'M0' where 'M' = meter number 1-8. The least significant six (6) digits of the data value appear on the volume display. The higher order non-zero digits of the data value, if present, appear on the Money display. Leading zeros appear as blanks.

3.9.13 S16 - Side B Meter Volume Totalizers

This statistic provides the same functionality on side B as S15

3.9.14 S17 - S20: RESERVED

3.9.15 S21 - Side A Error/Event Log

Sub-statistic numbers in the format 'XX' with the range 01-50 representing the set of error/events records maintained by the program, with the record in sub-statistic 01 being the most recent. Display error log data by using the two (2) data `pages' shown in an alternating sequence at a 1 second per page.

See Error Codes for a list of error codes.

Page 1 has the following format:

.HH.MM, not used

CC.DD.NN, not used

where:

HH = hour, not used

MM = minute, not used

CC = error code

DD = device number

NN = logical nozzle number

Page 1 has the event time on the Money display in the format HH.MM, not used. The volume display has data in the format CC.DD.NN where CC = the error/event code in the range 1-99, DD = the device number associated with the error/event and NN = the logical nozzle 0-8 selected at detection of the event (0 = none selected).

Page 2 has the following format:

MM.DD.YY, not used

C

where:

MM = month, not used

DD = day, not used

YY = year, not used

C = filling count

Page 2 shows the event date on the Money display in the format MM.DD.YY and the filling count for the side on the volume display.

3.9.16 S22 - Side B Error/Event Log

This statistic provides the same functionality on side B as S21

3.9.17 S23 - Side A Transaction History Log

Sub-statistic numbers in the format '.XX' with the range 01-10 representing the set of transaction records maintained by the program. The record displayed in sub-statistic 01 is the most recent and 10 is the oldest. View statistic data on the two (2) data 'pages' shown in an alternating sequence at a frequency of 1 second per page. Page 1 has the transaction amount on the money display. The volume display has the transaction volume. Page 2 shows the unit price on the money display and volume display has the transaction volume.

3.9.18 S24 - Side B Transaction History Log

This statistic provides the same functionality on side B as S23

3.9.19 S25 - Total Number of Power Cycles

The money display is blank and the power cycle counter value appears on the volume display. Sub-statistic numbers are displayed in the format '0X' where X = the selected configuration parameter defined as follows:

00. Number of Power Cycles

01. Number of Software Resets

02. Number of Cold Start Power Cycles

3.9.20 S26 - Reset history

This statistic provides information for a software engineer to aid in troubleshooting.

Shows the date, time, reason, and return location for the last 50 resets. Sub-statistic numbers in the format '.XX' with the range 01-50 representing the set of reset event records maintained by the program. The record displayed in sub-statistic 01 is the most recent and 50 is the oldest.

View statistic data on the two (2) data 'pages' shown in an alternating sequence at a frequency of 1 second per page. Page 1 shows the event time on the Money display in the format HH.MM. The volume display has data in the format TT.FFFF where TT = the trap id, FFFF = the value of the trap flag register, (TFR) at detection of the reset.

Page 2 shows the event date on the Money display in the format MM.DD.YY and the return address as SS.OOOO where SS is the hex code segment, and OOOO is the hex offset into the code segment. The return address can be used to determine the PC contents when the trap occurred. This can be especially helpful for unexpected traps such as illegal instructions, odd word fetches, etc.

3.9.21 S27 - Statistic of the WIPs

The information below is requested from the serial WIP to be indicated on the iGEM display

M = Meter number, meter 1 - 12

0M, WIP serial number

Batch number: 010725 (YYMMDD, i.e. 25. July 2001)

Number 1004

Meter 01

2M, totalizer of the WIPs, 8 digits (least significant 6 digits of the data appear on the volume, higher order 2 digits to the right of the money display)

totalizer: (i.e. 251210,04 litre)

Meter 1

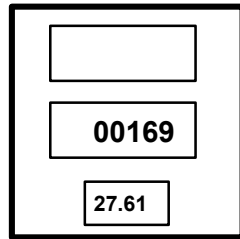
4M, previous WIP totalizer, (Totalizer of replaced WIP) (least significant 6 digits of the data appear on the volume, higher order 2 digits to the right of the money display), and counter of replaced WIPs, 3 digits to the left of the money display

Counter of replacements (i.e. 1)

totalizer: (i.e. 341560,04 litre)

Meter 1

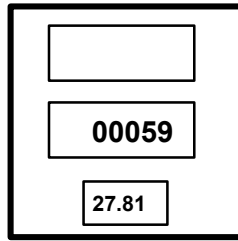
6M, pulse errors of the WIP



pulse errors: (i.e. 169)

Meter 1

8M, back pulses of the WIP



backpulses: (i.e. 59)

Meter 1

3.10 Weights and Measures Mode

If you enter the maintenance mode through a weights and measures entry, a special weights and measures mode version of the maintenance mode automatically starts. This special mode is designed to make it as easy as possible to display the blend ratio change event logs and volume metering change event logs required by Weights and Measures.

If the dispenser is configured as a blender, you enter the View Blend Ratios mode first. After you finish viewing the blend ratio or if the dispenser is not configured as a blender, the View Volume Metering Unit Change Counters mode begins.

The weights and measures mode is side specific. It shows the blend ratio logs and volume metering unit logs for the side that you are facing when using the infrared device.

3.10.1 View Blend Ratios Mode

When you enter this mode, the sale display contains the words bLEnd rAtioS and the current blend ratios for all the blended products are displayed in the current price display for a maximum of 20 seconds. If you don't press any other buttons within 20 seconds, or if you press the CLEAR button, the system enters the View Volume Metering Unit Change Counters mode.

If you press ENTER or NEXT, the system enters the View blend Ratio Change Counters mode.

3.10.2 View Blend Ratio Change Counters Mode

In this mode, the following sequence repeats every 20 seconds for every blended product. When all products finish displaying, the system enters the View Volume Metering Unit Change Counters mode.

- The corresponding unit price display contains Pr n where n is the product number, also known as the logical nozzle number.
- The money display contains the current counter value showing how many times this product's blend ratio has changed.
- The volume display contains the current blend ratio

If you press one of the following keys while you are in this mode, the corresponding action occurs:

CLEAR The system enters the View Volume Metering Unit Change Counters mode.

ENTER The system enters the View Blend Ratio Change Event Logs mode.

NEXT The next product's change counter data in the sequence is displayed, unless you are viewing the last product's change counter. Otherwise the system enters the View Volume Metering Unit Change Counters mode.

3.10.3 View Blend Ratio Change Event Logs Mode

In this mode, the following sequence repeats every 20 seconds for the last ten event logs for the selected product. When all ten event logs are finished displaying, control returns to the previous mode.

The corresponding unit price display contains bC n where n is the blend change event number (1-10) where 1 is the last blend change event and 10 is the oldest stored change event.

1. The sale display alternates every two seconds between the following pages:
2. The money display displays either LOCAL or SERIAL depending on whether the blend ratio change came from local programming or from the serial link to the site controller and the volume display contains the blend ratio that it was changed to with this event.
3. The money display contains the date of the event in the form of mm.dd.yy where "mm" is the month, "dd" is the day, "yy" is the year. The volume display contains the time of the event in the form of hh.mm where hh is the hour (0-23) and mm is the minute (0-59).

If you press one of the following keys while in this mode, the corresponding action is taken:

CLEAR The system exits the View Blend Ratio Change Event Logs mode and returns control to the View Blend Ratio Change Counters log.

ENTER The system exits the View Blend Ratio Change Event Logs mode and returns control to the View Blend Ratio Change Counters log.

NEXT The next blend change event displays. If you are viewing event 10, it will wrap around and show event 1.

UP The next blend change event displays. If you are viewing event 10, it will wrap around and show event 1.

DOWN The previous blend change event displays. If you are viewing event 10, it will wrap around and show event 1.

3.10.4 View Volume Metering Unit Change Counters Mode

In this mode, the following items display for 20 seconds

1. Unit price displays contain Unit (for volume metering unit)
2. Money price display contains the current counter value showing how many times the volume metering unit was displayed
3. Volume display contains the current volume metering unit described as follows:

LitErs Liters volume unit

US GAL U.S. Gallons volume unit

IP GAL Imperial Gallons volume unit

If you press one of the following keys while in this mode, the corresponding action happens:

CLEAR The system exits the weights and measures mode.

ENTER The system enters the View Volume Metering Unit Change Event Logs mode.

NEXT The system exits the weights and measures mode.

3.10.5 View Volume Metering Unit Change Event Logs Mode

In this mode, the following sequence repeats every 20 seconds for the last ten event logs for the volume metering unit changes. When all ten event logs have finished displaying, control returns to the previous mode.

The corresponding unit price display contains UC n where n is the unit change event number 1-10; 1 is the last unit change event and 10 is the oldest stored change event.

1. The sale display alternates every two seconds between the following two pages:
2. The money display is blank and the volume display contains the metering unit that was changed to with this event described as follows:

LitErs Litres volume unit

US GAL U.S. Gallons volume unit

IP GAL Imperial Gallons volume unit

3. The money display contains the date of the event - mm.dd.yy where mm is the month, dd is the day, yy is the year. The volume display contains the time of the event in the form of hh.mm where hh is the hour (0-23) and mm is the minute (0-59).

If you press one of the following keys while in this mode, the corresponding action happens:

CLEAR The system enters the weights and measurements mode.

ENTER The system enters the weights and measurements mode.

NEXT The next volume metering unit change event displays. If you are viewing event 10, it wraps around to show event 1

UP The next volume metering unit change event displays. If you are viewing event 10, it wraps around to show event 10

DOWN The next volume metering unit change event displays. If you are viewing event 10, it will wrap around to show event 10.

3.11 Readout of Totalizers/Totals in Weights and Measures Mode

If you enter the maintenance mode through a weights and measures entry (CLEAR button on Remote Control), a special weights and measures mode version of the maintenance mode automatically starts. This special mode is designed to make it as easy as possible to display the Totals / Totalizers.

If you don't press any other button within 20 seconds, the next values are automatically displayed.

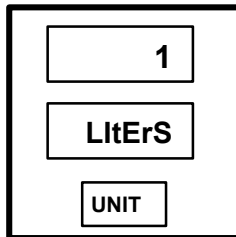
Pressing NEXT displays the next totals/totalizer value.

Pressing CLEAR exits the weight and measure mode.

Weight and measure mode is exited when all totals/ totalizer are indicated.

Access the Totalizers/Totals readout by pressing the CLEAR button.

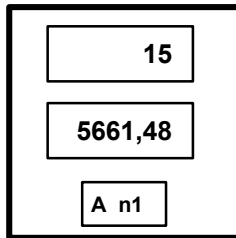
The display will show:



Indication, that the values are shown in Litres

Automatically after 20 sec. or when you press the NEXT button the totalizers/totals value appear:

The least significant six (6) digits of the data value appear on the volume display. Higher order non-zero digits of the data value, if present, appear on the money display. Leading zeros appear as blanks.



i.e. 155661,48 litres

Side A nozzle 1

The least significant six (6) digits of the data value appear on the volume display. Higher order non-zero digits of the data value, if present, appear on the money display. Leading zeros appear as blanks.

4 Error Codes

4.1 Error/Event Classification

Depending on how serious an error or event is, it may be handled differently. Errors/Events shall be classified as specified in the table below:

Error Type	Classification	Description
LOG	A	Error/event is only logged.
TERMINATION	B	Error/event is logged as specified above and filling is terminated.
SEMI-FATAL	C	Error/event is logged as specified above, filling is terminated and current dispenser side is closed.
FULLY-FATAL	D	Error/event is logged as specified above, filling is terminated and both dispenser sides are closed.
CATASTROPHIC	E	Error/event is logged as specified above, filling is terminated and both dispenser sides are closed, power cycle must be done
INDICATION	F	Error/event is not logged, but certain message on display gives information about error
DISABLED	G	Error is not logged, no action

4.2 Error/Event Types

The following table specifies how error/events are classified. The template shall determine the classification of each error/event. The error/event numbers in the first column of the table may be changed during implementation and are provided in this table only as an aid in comprehending the information.

No.	Error/Event	Description	Classification
1	Flash Program Memory Failure	CRC on Flash Program Area is incorrect	E
2	Flash Template Memory Failure	CRC on Flash Template Area is incorrect	E
3	RAM Memory Failure	Read/Write/read test has failed	E
4	Power Failure	Power drops below 4.5VDC.	Causes Reset
5	Error Log Database Failure	CRC on Error Log Database is incorrect	D + Clear DB
6	Configuration Database Failure	CRC on Configuration Database is incorrect	D + Clear DB
7	Unit Price Database Failure	CRC on Unit Price Database is incorrect	D + Clear DB
8	Statistics Database Failure	CRC on Statistics Database is incorrect	D + Clear DB
9	Event Log Database Failure	CRC on Event Log Database is incorrect	D + Clear DB
10	Totals Database Failure	CRC on Totals Database is incorrect	D + Clear DB

11	Totalizers Database Failure	CRC on Totalizers Database is incorrect	D + Clear DB
12	EM Totalizers Database Failure	CRC on EM Totalizers Database is incorrect	D + Clear DB
13	Identity Prom Data Error	CRC on Identity Prom data is incorrect	A
14-15	N/A	N/A	N/A
16	Overflow Limit Reached	Limit for suppressed overflow has been reached	B
17	Hose test volume	Hose test volume out of tolerance	B
18	Hose test volume	Hose test volume out of tolerance (on three consecutive fillings)	C
19	N/A	N/A	N/A
20	Display Read back Error	Configured maximum number of display read back errors has been reached (-> F.17.02)	B
21-24	N/A	N/A	N/A
25	Filling Start with Zero Unit Price	Attempted start of filling with Zero (0) Unit Price	B
26	Filling Start with No Unit Price Downloaded	Attempted start of filling with no Unit Prices downloaded from POS.	B
27	Filling Start after Unit Price Change	Attempted start of filling before Unit Price change timeout (-> F23.04)	B
28	Filling start without Preset Entry	Nozzle Lifted without Preset Entry though required (-> F24.01 = 1)	B
29	Sale start price SAT not equal MASTER	Attempted start of filling and the unit price is not equal at SAT and MASTER	B
30	POS Communication Lost	No poll from POS for time exceeding configured maximum offline time -> F23.02	C
31	POS task buffers full	Rx and/or Tx buffers in DART task is full	A
32	POS CRC error	CRC of received POS message is incorrect	A
33	N/A	N/A	N/A
34	STOP button pushed	Filling terminated due to STOP button press	B
35	Blending out of tolerance	Blend Error exceeds configured max Value (%) (-> F.18)	B
36	No flow on one meter at high speed/blender pump	Volume ratio between the assigned meters is < 0,5%	B
37	VAP Monitor 10 fillings bad	10 fillings in row with vapor recovery flowrate out of tolerance	A
38	VAP Monitor 72h elapsed	72 hours elapsed after error code 37	A

39	VAP Monitor internal error	Internal VAP Monitor System (Vaporix) error or not connected	A
40	VAP Monitor Reset	VAP Monitor System (Vaporix) has been reset	A
41	Motor feedback	Errors from motor	A
42	Vap not calibrated	VAP system not calibrated yet	A
43	Vap valve current low	Valve current is low (e.g. no valve connected)	A
44	Vap valve current high	Valve current is high(e.g. short circuit on valve output)	A
45	Vap contactor error	No contactor detected	A
46	Vap external error	Error detected via external signal input	A
47	Vap electric error	Vap hardware error	B
48-49	N/A	N/A	N/A
50	Error on WIP in use	Errors from WIP used in Transaction (-> F17.00)	B
51	Error on idle WIP	Errors from WIP not used in Transaction (-> F17.01)	A
52	No response from WIP in use	No response from WIP used in Transaction	A
53	N/A	N/A	N/A
54	Back pulses from idle WIP	Back pulses from WIP not used in Transaction (-> F16.03)	B
55	N/A	N/A	N/A
56	Forward Flow on idle WIP	Forward flow on WIP Not used in Transaction (indication of leakage) (-> F19.14)	B
57	N/A	N/A	N/A
58	Comm failure with WIP in use	WIP used in transaction didn't respond on re-transmission.	B
59	Comm failure with WIP in idle	WIP didn't respond to heart beat message	A
60-61	N/A	N/A	N/A
62	WIP serial number mismatch	WIP is to exchange	C
63-69	N/A	N/A	N/A
70	No Flow Timeout	Filling was started but no fuel has been dispensed for configurable time (-> F17.03)	B
71	Consecutive number of no flow	Configured number of maximum consecutive No Flow events has been reached (-> F17.04)	B

72	Flow Lost Timeout	Flow was lost for configured maximum time (-> F17.03)	B
73	Consecutive number of lost flow	Configured number of maximum consecutive Flow Lost events has been reached (-> F17.05)	B
74	Unfinished filling	Filling ended before preset or prepay limit was reached	B
75	Consecutive number of unfinished fillings	Configured number of unfinished fillings has been reached (-> F17.06)	B
76-79	N/A	N/A	N/A
80	RTOS mail buffer exhausted	Mail buffer of RTOS is exhausted	B
81	F03 not programmed	F03 is not programmed and pump running in standalone mode	F
82	F04 not programmed	F04 is not programmed and pump running in standalone mode	F
83	F05 not programmed	F05 is not programmed and pump running in serial mode	F
84	F06 not programmed	F06 is not programmed and pump running in serial mode	F
85	F37 not programmed	F37 (pump model type) is not programmed	F
86	F38 not programmed	F38 is not programmed	F
87-99	N/A	N/A	N/A

5 Miscellaneous IGEM Functions

5.1 Performing a Cold Start

Perform a cold start to reset all statistical and functional values.

1. Turn off power to the pump computer board.

1. On the IGEM pump computer board, short across the cold start jumper S15.
2. While keeping it shorted, apply power to the pump computer board, keeping it shorted until the word COLd displays in the volume display.
3. Remove the short across. The cold start procedure is now complete, the word Cold disappears from the display.

2. Perform Soft Coldstart by entering F01.

5.2 IGEM Data Dump

To help diagnose problems at a site, the IGEM pump computer can dump function programming and statistical data through the Service Terminal Program to a file on the laptop. This file can then be sent to Wayne for analysis.

The IGEM data dump is accessed by a special button on the Service Terminal Program called "IGEM DATA DUMP". This button is active only if maintenance mode has been entered and the current state shown in the unit price displays is "F--". The display on the Service Terminal program will show "ENTER FUNCTION". If the maintenance mode is in this state, then selecting the IGEM DATA DUMP button causes the Service Terminal Program to request a filename to which to upload the IGEM data. When the file is selected, the data dump is started.

Upon completion of the data dump, the IGEM will go back to function entry mode where other functions may be accessed.

5.3 Pumping unit flow lost check to avoid dry operation when two meters are assigned to one nozzle

On pumps/dispensers where more than one meter (i.e. 130l/min or blenders) is used, the flow through the meters is checked. At start of filling, after 5 litres are dispensed, the flow ratio is checked. If the ratio between the meters is smaller than 0,5%, the filling will be terminated and error code 36 logged.

Example, Diesel pump 130 l/min:

1. No flow from 1st meter, flow from 2nd meter => iGEM will stop filling after 5 litres.

This functionality is disabled when W&M mode is selected by function F01.

5.4 Calibration when two meters are assigned to one nozzle

If a calibration of the GHM is performed and more than one meter is assigned to one nozzle, the valve of the meter which is not being calibrated is closed automatically due to the open flap of the WIP pulser.

After calibration the flow check functionality is disabled for 3 fillings.

5.5 Pump Motor Feedback

Global Century and Global Star pumps built in Europe are equipped with the ELNOR motor with build in overload protection. The overload protection (thermal switch) doesn't have RESET on the motor. Instead iGEM detects if the motor protection has turned off the motor. If so, filling will be terminated and error logged. New filling on that can't be started until error has been reset.

The motor protection error (Error code 41) can be reset in different, see function F43.

That means, that in all pumps where this functionality is not requested (e.g. dispensers, LPG dispensers) or not wanted, the motor feedback parameter has to be disabled manually by the remote control.

From iGEM Software release (7.19) the motor feedback functionality will be switched on automatically for all applications after coldstart.

6 Software Download

The iGEM program, the so called BIN-file (iGEMxxxx.BIN) can be loaded by either a PC or a iGEM Master calculator via the serial interface (sitecontroller interface).

For the program loading, the pump computer's load sequence has to be activated by authorised service personnel (see below).

The Software can be loaded by 2 alternatives:

1. Bootstrapp

Bootstrapp mode has to be executed when

- the W&M software version has been changed or
- on boards where no pump software has been loaded to before or
- when while downloading the trasmission has been interrupted

In case of the events above the PRG LOAD switch on the iGEM has to be switched on. Make sure that you always fulfil the local Weight and Measure demands.

2. Function 98

This mode can be executed only with iGEM software loaded to the board.

It is possible on RS485 (2 wire DART) or RS422 (4-wire LJCL) interface.

When program has been downloaded, a coldstart shall be performed.

To setup a specific pump model the Function F37 has to be assigned. This will load the default pump configuration.

To setup specific country parameters Function F38 has to be assigned to a defined country code.

Functions parameters modified by country and model selection should be programmed after F37 and F38 has been configured.

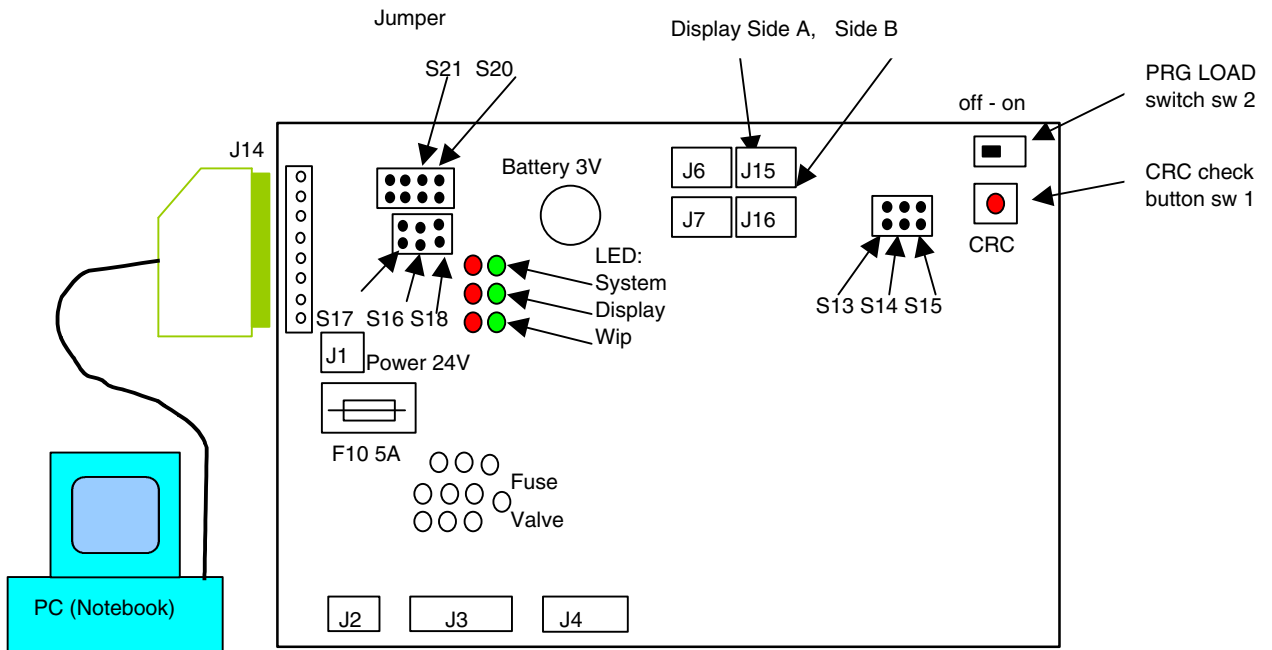
Beginning from iGEM software version 7.15 and PC Serviceterminal version 2.0 (SERVTERM2.0) the W&M software version is checked at beginning of the download sequence.

If the W&M part of the software to be downloaded is different to the existing W&M software part on the iGEM board, the download process is interrupted and "W&M different" is displayed in the PC screen respectively "E-diff" on the iGEM Master's display.

Switch PRG LOAD switch on the iGEM board into ON position before retry. Make sure that you always full fill the local W&M demands if the switch is covered by a seal.

Since breaking the seal on the switch is not allowed in Germany a new preapproved board has to be installed.

6.1 Bootstrapp Download PC (Notebook) to iGEM Board (pump)



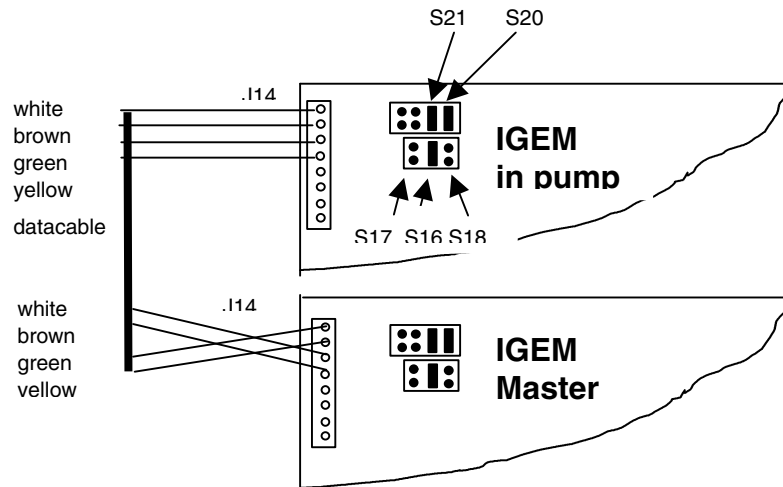
- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Turn off the power to the iGEM in pump. 2. Connect PC and iGEM via download cable, (PC com port to J14 on the iGEM board) 3. Switch on PC 4. Check Jumper on the iGEM (picture). Set Jumper S21 (5 Volt to download box), Jumper S20, S16 and Jumper S13 (BOOT), if required S15 COLDSTART. 5. Switch on the iGEM 6. Start ServTerm.exe software at PC. Select "Boot" by BOOT button. "Entering GEM Boot Strap" appears. 7. Confirm "Entering GEM Boot Strap". 8. Select new iGEM.BIN file. | <ol style="list-style-type: none"> 9. The file is now downloaded to the iGEM board, while each downloaded block is shown at the display.

If "W&M different" is displayed
Go to step 11 10. After downloading check if "COLDSTART" is required .
Remove Jumper S13 (S15).
When required switch PRG LOAD OFF. (left position)
Reprogram iGEM if required 11. Switch PRG LOAD ON. (right position)
Go to step 1 and restart download.
Make sure that you always fulfil local W&M demands. |
|--|--|

When download is completed and COLDSTART jumper in place the display shows "COLD" on the sales display until the COLDSTART jumper (S15) is removed.

Also make sure to restore the communication jumpers to operate with POS protocol correct.

6.2 Bootstrapp Download, iGEM Master (supporter Kid) to iGEM Board in pump



Note:

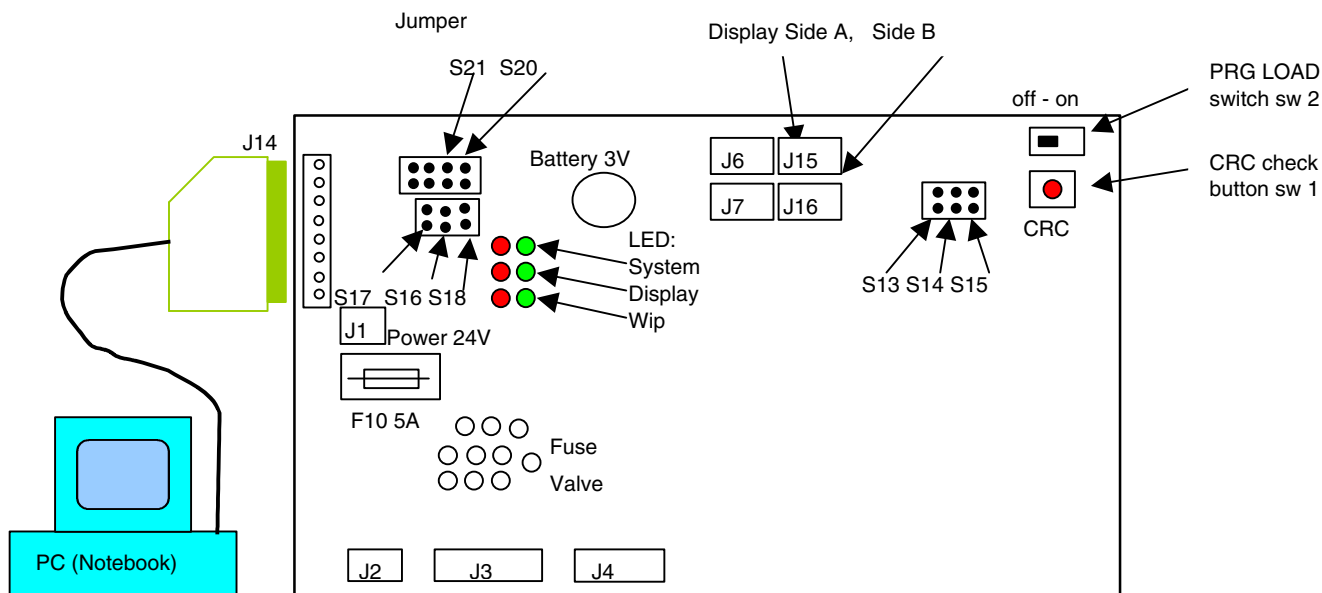
Set the iGEM Master (supporter kit) in function F21.09 to 4 (no maintenance mode entry without pressing the CRC button first).

<ol style="list-style-type: none"> 1. Turn off the power to the iGEM in pump. 2. Connect iGEM Master (supporter kit) and iGEM in pump (J14) via data cable 3. Connect power cable (24V) between iGEM Master, iGEM in PUMP and power supply in pump. 4. Check Jumper on the iGEM pump computer and supporter kit (picture above). Set Jumper S20 and Jumper S16. (S21 has no effect). Set jumper S13 (BOOT) on the iGEM in pump and if required set S15 COLDSTART. <u>Important:</u> do not set Jumper S17! 5. Switch on power. 	<ol style="list-style-type: none"> 6. Press the CRC button on the iGEM Master. 7. On the iGEM Master display appears "bootld". IF "E diff" appears go to step 10. 8. The file is now downloaded to the iGEM board, while each downloaded block is shown on the master's money display "PRO XX". The volume display shows "0 242". 9. After downloading check if "COLDSTART" is required . Remove Jumper S13 (S15). When required switch PRG LOAD off. (left position) Reprogram iGEM if required 10. Switch PRG LOAD ON (right position) and follow step 1 to restart the download. Make sure that you always fulfil local W&M demands.
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When download is completed and COLDSTART jumper in place the display shows "COLD" on the sales display until the COLDSTART jumper (S15) is removed.

Also make sure to restore the communication jumpers to operate with POS protocol correct.

6.3 Function 98 Download PC (Notebook) to iGEM Board



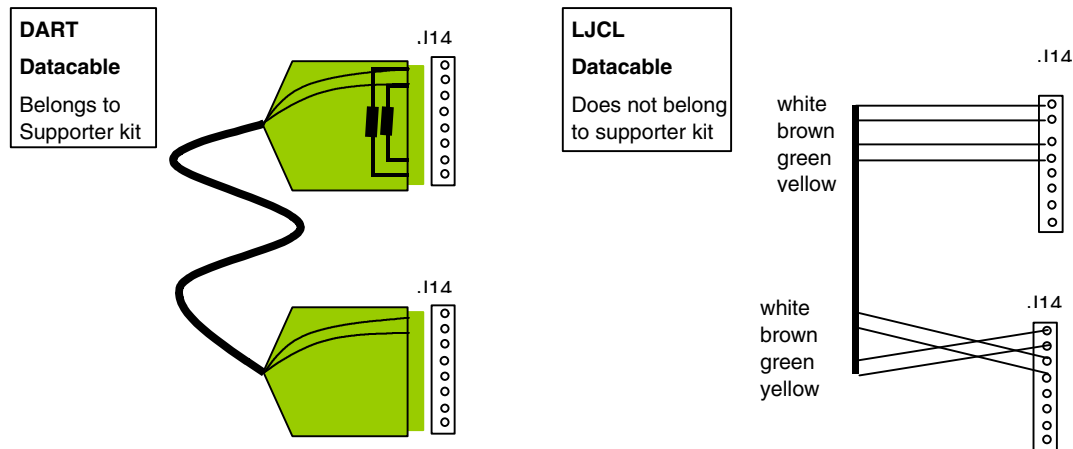
Set jumper according link type

DART = S18, S20 and S21. 	LJCL = S16, S17, S20 and S21 
<ol style="list-style-type: none"> 1. Turn off the power to the iGEM in pump 2. Connect PC and iGEM via download cable, (PC com port to J14 on the iGEM board). 3. Switch on PC. 4. Check Jumper on the iGEM (picture). DART: S18, S20 and S21 LJCL: S16, S17, S20 and S21 if required S15 COLDSTART. 5. Switch on the iGEM. 6. Start ServTerm.exe software at PC and select protocol by TYPE button. 7. Press the CRC button on the iGEM pump computer to start download process. 8. On the pump display appears "PASS 1". 9. Enter service password 1 "xxxx" on PC and confirm by ENTER. On the pump display appears "PASS 2". 10. Enter service password 2 "xxxx" on PC and confirm by ENTER 	<ol style="list-style-type: none"> 11. Select Function Register 98, and confirm by ENTER twice. 12. On the pump display appears "PASS". 13. Enter Download Password "yy" from PC and press ENTER and select iGEM file. The file is now downloaded to the iGEM board, while each downloaded block is shown at the PC "PRO XX". The pump display shows "burn". If "W&M different" is displayed Go to step 15 14. After downloading check if COLDSTART is required . Restore Jumpers. When required switch PRG LOAD OFF. (left position) Reprogram iGEM if required. 15. Switch PRG LOAD ON. (right position) Go to step 1 and restart download Make sure that you always fulfil local W&M demands.



When download is completed and COLDSTART jumper in place the display shows "COLD" on the sales display until the COLDSTART jumper (S15) is removed.

Also make sure to restore the communication jumpers to operate with POS protocol correct.

6.4 Function 98 iGEM Master to iGEM Board (pump)



Set jumper according link type

DART = S18, S20 and S21. 	LJCL = S16, S17, S20 and S21 
--	--

Note:

Set the iGEM Master (supporter kit) in function F21.09 to 4 (no maintenance mode entry without pressing the CRC button first).

<ol style="list-style-type: none"> Turn off the power to the iGEM in pump. Connect via data cable (J14) iGEM into pump and iGEM Master. Connect power cable (24V) between iGEM Master and iGEM in pump and power supply. Check Jumper on the iGEM (picture). DART: S18, S20 and S21 LJCL: S16, S20 and S21 if required S15 COLDSTART. <u>Important:</u> do not set Jumper S17! Switch On power to iGEM Master and iGEM in pump After 3 sec. Press the CRC button on the iGEM Master. After indication of program CRC press ENTER button. On the pump display appears "PASS 1". Enter password 1 "xxxx", and press ENTER. On the pump display appears "PASS 2".. Enter password 2 "xxxx", and press ENTER. Select Function register 98 and press ENTER. On the pump display appears "Press". 	<ol style="list-style-type: none"> Press the CRC button on the supporter kit. The display on the supporter kit shows "dLoAd". Press ENTER on the iGEM pump computer. The display on the iGEM pump computer shows "PASS". Enter Pass "yy" on the iGEM pump computer and press ENTER. The file is now downloaded to the iGEM board, while each downloaded block is shown at the display "PRO XX". The pump display shows "burn". If "W&M different" is displayed Go to step 17 After downloading check if COLDSTART is required. Remove Jumpers. When required switch PRG LOAD off. (left position) Reprogram iGEM if required. Switch PRG LOAD ON. (right position) Go to step 1 and restart download Make sure that you always fulfil local W&M demands.
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When download is completed and COLDSTART jumper in place the display shows "COLD" on the sales display until the COLDSTART jumper (S15) is removed.

Also make sure to restore the communication straps to operate with POS protocol correct.

NOTE: “This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense”.



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