CALEFFI Hydronic Solutions

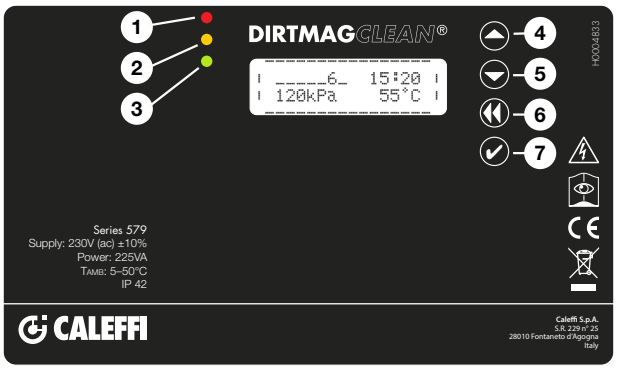
Self-cleaning magnetic dirt separator strainer

579 series

PROGRAMMING MANUAL

CONTENTS

Front panel

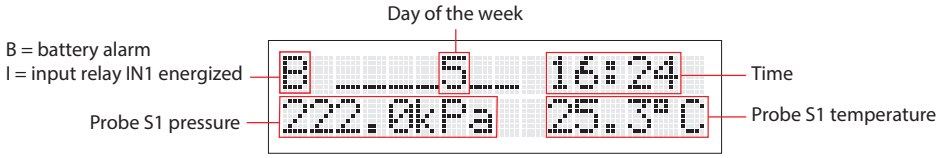


LED indicators:

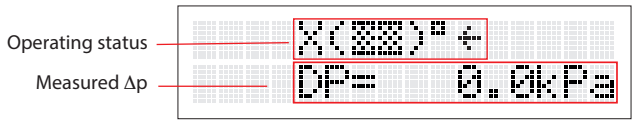
1 Red LED: steady (alarm notification with system locked) flashing (fault, system operating)
2 Yellow LED: indication of cleaning or additives delivery in progress or resumption of operations following reset
3 Green LED: flashing (initial cleaning) steady on (normal operation)
4 UP button
5 DOWN button
6 BACK button
7 Confirmation/OK button

Display

The following information normally appears on the display:



From the main display in standby mode, press any key once to activate the display, press again to view the operating status:



NOTE: to change language refer to menu point 2.2

Symbols used

The symbols shown below are a selection of those displayed during system operation.

Meaning	Display message	Alternate message
Strainer with all valves closed and washing not started		
Device filling phase		
Drainage phase		
Drain valve closing		
Plant inlet valve opening		
Plant inlet valve closing (with dirty strainer)		
Strainers cleaning in progress		
Internal functional tests		
System not operating, with error 11 (For details of errors refer to the faults table)		
Sleep function enabled		
Filtration		

Menu

To access the various menus and submenus, hold the confirm/ok button for more than 3 seconds. To navigate among the various submenus, use the “UP” or “DOWN” keys. Press the “BACK” key to return to the previous submenu and then press it again to return to the main menu, or wait 2 minutes without pressing any keys.
Press "OK" to enter the selected menus.

1. Forcing Menu

1.1 Alarms reset
Use the “UP” or “DOWN" keys and select “ON” to reset the active alarms and faults. Select “OFF” to quit without performing any operations. The alarms and faults will not be cleared from the historic record.

1.2 Cleaning
Use the “UP” or “DOWN" keys and select “ON” to clean the strainer immediately. Select “OFF” to quit without performing any operations. Forcing is possible only if the device is not performing any other operations (with yellow LED off). E.g. initial filling or sensors check.

1.3 Initial cleaning
Use the “UP” or “DOWN" keys and select “ON” for initial cleaning of the strainer. Select “OFF” to quit without performing any operations. This function can be used to wash the system using the medium contained in the system. This avoids the need to drain large quantities of medium and the related need for complicated air bleeding operations. When the set differential is reached a strainer cleaning cycle is triggered immediately. The system quits the initial cleaning function as soon as the set time period has elapsed. When this function is active the green LED will flash. To disable the function in advance, select "OFF". The function is not disabled when the device is reset.

1.4 Supply of additives
Use the “UP” or “DOWN" keys and select “ON” to start the additives supply procedure. Select “OFF” to quit without performing any operations. Additives can be added to the system medium by means of the appropriate function. In this case the system is set to standby, after having performed a forced cleaning cycle, with the aim of reducing the use of mains water as far as possible, taking advantage of tank emptying. During the standby phase the necessary additives can be supplied to the device using the 1” cap located in the upper part of the strainer, see the typical components drawing. Carefully check that the cap offers a hermetic seal, in order to prevent leakage or flooding. This phase is composed of the following operations:
- closing of inlet V1
- emptying (opening of valve V3)
- strainers cleaning by starting motor M and opening valve V2
- closing of emptying valve V3
- wait confirmation from menu
- filling via V2 or with opening of V1. To confirm, press the “back” button followed by “OK” as shown on the display.
- opening of inlet V1

During the standby phase you can supply the necessary additives to the device.

1.5 Automatic checks
Use the “UP” or “DOWN” keys to select the submenu. The regulator performs a periodic check on operation of the various strainer functions. This procedure can be carried out manually through the item on the regulator menu.

1.5.1 Sensors control menu
Use the “UP” or “DOWN” keys and select “ON” for immediate start-up of the procedure for checking correct operation of the Pressure and Temperature sensors. Select “OFF” to quit without performing any operations.

1.5.2 Automatic offset menu
Use the “UP” or “DOWN” keys and select “ON” to set automatic/manual correction of sensor pressure values. This is normally carried out in the factory but the values can be corrected automatically or manually. Select “OFF” to perform manual pressure correction (expert users only). These checks are performed during the cleaning cycle or additives supply cycle.

1.6 Manual Commands (forcing)
Use the “UP” or “DOWN” keys and select the submenu by means of the “ON” key. Selecting the various items makes it possible to force operation of the strainer motor and valves. For safety reasons, forcing is possible only if the device is in normal filtration status, hence it is not performing sensors cleaning or checking operations.

1.6.1 Motor command menu
Use the “UP” or “DOWN” keys and select “ON” to start forced rotation of the motor. Select “OFF” to stop and "AUTO" to leave control duties to the management controller.

1.6.2 Inlet valve manual command menu
Use the “UP” or “DOWN” keys and select “ON” to force opening of inlet valve V1. Select “OFF” to close and "AUTO" to leave control duties to the management controller.

1.6.3 Drain valve manual command menu
Use the “UP” or “DOWN” keys and select “ON” to force opening of drain valve V3. Select “OFF” to close and "AUTO" to leave control duties to the management controller.

1.6.4 Domestic water inlet valve manual command menu
Use the “UP” or “DOWN” keys and select “ON” to force opening of domestic water inlet valve V2. Select “OFF” to close and "AUTO" to leave control duties to the management controller.

1.6.5 Drain cooling valve manual command menu
Use the “UP” or “DOWN” keys and select “ON” to request opening of the external valve. Select “OFF” to close and "AUTO" to leave control duties to the management controller.

1.7 Sleep forcing menu
Use the “UP” or “DOWN” keys and select “ON” to force the system to sleep status. Select “OFF” to quit without performing any operations. The sleep mode temporarily deactivates the device, setting it to standby status, with the valve V1 closing and without any control on the operation. This status allows the device to be disabled for a set time, for example when the system is shut down in the summer. At the end of the sleep phase the device will resume its normal operation. All valves are closed and de-energised in sleep status.

1.8 Device reset menu

Use the “UP” or “DOWN” keys and select “ON” to suspend the functions in progress and reset the alarms. Restart the device and perform an internal pressure check and water filling cycle, if necessary.

2. Parameters Menu

2.1 Date/time

Press “OK” to change the date and time. You can return to the previous menu at any time by means of the “back” key.

2.1.1 Hours Menu

Use the “UP” or “DOWN” keys and select with “ON”. To change the current hours use the “UP” or “DOWN” keys and press OK to confirm and return to the previous menu. Press “back” to select the next digit.

2.1.2 Minutes Menu

Use the “UP” or “DOWN” keys and select with “ON”. To change the current minutes use the “UP” or “DOWN” keys and press OK to confirm and return to the previous menu. Press “back” to select the next digit.

2.1.3 Date Menu

Use the “UP” or “DOWN” keys and select with “ON”. To change the current date use the “UP” or “DOWN” keys and press OK to confirm and return to the previous menu. Press “back” to select the next digit.

2.1.4 Month Menu

Use the “UP” or “DOWN” keys and select with “ON”. To change the current month use the “UP” or “DOWN” keys and press OK to confirm and return to the previous menu. Press “back” to select the next digit.

2.1.5 Year Menu

Use the “UP” or “DOWN” keys and select with “ON”. To change the current year use the “UP” or “DOWN” keys and press OK to confirm and return to the previous menu. Press “back” to select the next digit.

2.2 Language

Press “OK” to change the language. Use the “UP” or “DOWN" keys to select “Italiano”, “English”, “Francais” or “Deutsch”. Confirm with the “OK” key. You can return to the previous menu at any time by means of the “back” key.

2.3 Cleaning setpoint

Use the “UP” or “DOWN” keys and select the submenus by means of the “ON” key. The option makes it possible to edit the various cleaning phase parameters. Some menus may be disabled because they are in conflict with other settings: for example, indicating cleaning with instantaneous Δp, it will not be possible to access the cleaning day selection menu.

2.3.1 Cleaning Type menu

Use the “UP” or “DOWN” keys and select by means of the “ON” key. The following cleaning types are available:

Manual

Start is generated by a manual command (see point 1.2)

Instantaneous **Δp**

During normal operation, the device monitors the strainer clogging level by measuring the pressure differential between the inlet and outlet as read by probes S1 and S2. When the difference exceeds a set and user-editable value (factory setting 15kPa – 150mbar), a filters cleaning cycle is started immediately. The differential pressure value must be appropriately selected based on the plant characteristics: values lower than 10kPa cannot be selected.

Delayed **Δp**

When Δp exceeds a specified value (the same value used to start the instantaneous cleaning cycle), cleaning is scheduled to take place at a time indicated by the user (delayed starting with respect to the scheduled time but after the set delta P has been reached, refer to menu 2.3.1)

Timed

You can perform a cleaning cycle on a specific day of the week, at a specific time, or on several days of the same week. The device is anyway cleaned even if the maximum set differential value is not exceeded during operation. Cleaning can also be scheduled monthly on a day from 1 to 28. For setting of the cleaning day and time, refer to menus 2.3.6, 2.3.7, 2.3.8

2.3.2 Cleaning Period menu

Use the “UP” or “DOWN” keys and select by means of the “ON” key.

You can select from the options: daily, weekly, two-weekly, monthly, two-monthly, quarterly, six-monthly.

2.3.3 Δp max menu

Use the “UP” or “DOWN” keys and select by means of the “ON” key. Set the strainer cleaning start Δp value (measured in kPa) using the “UP” or “DOWN” and “back” keys. Confirm with “OK”. The recommended value (factory setting) is 10 kPa.

2.3.4 Initial Δp max menu

Use the “UP” or “DOWN” keys and select by means of the “ON” key. Set the strainer cleaning start Δp value for the initial cleaning phase (measured in kPa) using the “UP” or “DOWN” and “back” keys. Confirm with “OK”. Set a Δp value in conformity with the characteristics of your installation.

2.3.5 Initial Duration menu

Use the “UP” or “DOWN” keys and select by means of the “ON” key. Set the initial cleaning duration hours using the “UP” or “DOWN” and “back” keys. Confirm with “OK”. The recommended value (factory setting) is 24 hours.

2.3.6 Cleaning Days menu

Use the “UP” or “DOWN” keys and select by means of the “ON” key. Set the value with the “UP” or “DOWN” and “back” keys. Confirm with “OK”.

Daily programming: one cleaning cycle is performed each day (see points 2.3.7 and 2.3.8).

Weekly programming: you can select on which days of the week to perform the cleaning operations: Example: 1_3__6_ (1 = Monday, 3 = Wednesday, 6 = Saturday).

Two-weekly programming: cleaning is carried out on the selected once every two weeks. Example: 8 = second Monday, 10 = second Wednesday.

Monthly programming: cleaning is carried out on the chosen day. Example: 18= 18th day of each month, 26 = 26th day of each month. Note: days available are 1 to 28

Programming every 2 months, every 3 months, every 6 months: cleaning is carried out on the selected day. Example: programming every 6 months, 63 = 63rd. day of the six month period

2.3.7 Start hour menu

Use the “UP” or “DOWN” keys and select by means of the “ON” key. The value is the start hour of programmed strainer cleaning. Set the value with the “UP” or “DOWN” and “back” keys. Confirm with “OK”.

2.3.8 minute hour menu

Use the “UP” or “DOWN” keys and select by means of the “ON” key. The value is the minutes of the programmed strainer cleaning start time. Set the value with the “UP” or “DOWN” and “back” keys. Confirm with “OK”.

2.3.9 Sleep weeks menu

Use the “UP” or “DOWN” keys and select by means of the “ON” key. The value is related to the weeks of duration of the sleep function. Set the value with the “UP” or “DOWN” and “back” keys. Confirm with “OK”.

2.4 Function parameters

Use the “UP” or “DOWN” keys and select the submenus by means of the “ON” key. The option makes it possible to edit the functional parameters of the filter.

2.4.1 Drain Tmax menu

Use the “UP” or “DOWN” keys and select by means of the “ON” key. Set the maximum permissible drain water temperature value. Choose the value after consulting local regulations. Factory setting: 50°C

2.4.2 Washing time

Use the “UP” or “DOWN” keys and select by means of the “ON” key. Set the strainer washing time value. Factory setting 120 seconds.

2.4.3 Filling type

Use the “UP” or “DOWN” keys and select by means of the “ON” key. A choice can be made between filling via valve V2 (e.g. from the water mains) or via valve V1 (system water). Factory setting: V1

2.4.4 Pulse enabling

Use the “UP” or “DOWN” keys and select by means of the “ON” key. You can enable a temporary domestic water pressure pulse at the start of emptying, to overcome any siphons on the drain pipeline.

2.5 Parameters reset

Use the “UP” or “DOWN” keys and select the submenus by means of the “ON” key. The option can be used to return all the strainer functional parameters to their factory settings. Caution: once the parameters have been reset this action cannot be undone. The parameters reset also initialises the MODBUS communication parameters.

3. Historic Data Menu

3.1 Alarms

Press “OK” to view the alarms history. The following are displayed: alarm number, related code, date and time of acknowledgement. Use the “UP” and “DOWN” key to display the complete list. You can return to the previous menu at any time by means of the “back” key. The system saves the last 20 alarms that have tripped. The alarms history display page shows a list of alarms starting from the latest alarm to trip. The indication shows the alarm number and then the associated code.

The display is:

Alarm n. CODE NUMBER DATE TIME

where: NUMBER is the sequential number of the alarm, CODE is the alarm/error code, DATE and TIME show the exact moment when the alarm tripped.

3.2 Faults

Press “OK” to view the faults history. The fault number is displayed with the associated code, date, and time of recognition. Use the “UP” and “DOWN” key to display the complete list. You can return to the previous menu at any time by means of the “back” key. The system saves the last 20 alarms that have tripped. The faults history display page shows a list of faults from the latest one to occur. The indication shows the fault number and then the associated code.

The display is:

Fault n. CODE NUMBER DATE TIME

where: NUMBER is the sequential number of the fault, CODE is the fault code, DATE and TIME show the exact moment when the fault occurred.

3.2 Last Cleaning

Press “OK” to view the last cleaning cycle carried out, in date and time format. You can return to the previous menu at any time by means of the “back” key.

4. Communication

4.1 ModBus Enabling

Use the “UP” or “DOWN” keys and select by means of the “ON” key. Press “OK” to enable communication. You can return to the previous menu at any time by means of the “back” key. Default “ON”

4.2 ModBus Address

Use the “UP” or “DOWN” keys and select by means of the “ON” key. Set the device ModBus address value. The number must be from 1 to 250. Default “1”

4.3 Modbus Parity

Set the value with the “UP” or “DOWN” and “back” keys. Confirm with “OK”. Enable to select parity "EVEN". The default value is “ON”.

CAUTION: ModBus communication parameters must be edited only by a qualified technician because it may lead to suspension of the active communication at a given time, with consequent system malfunctions of varying degrees of seriousness.

5. Information

5.1 Model version

Use the “UP” or “DOWN” keys and select by means of the “ON” key. The model number is displayed together with the software version. You can return to the previous menu at any time by means of the “back” key.

5.2 Registration number

Use the “UP” or “DOWN” keys and select by means of the “ON” key. The registration number and serial number are displayed. You can return to the previous menu at any time by means of the “back” key.

5.3 Sensor S1 serial number

Use the “UP” or “DOWN” keys and select by means of the “ON” key. The sensor S1 model number and serial number are displayed. You can return to the previous menu at any time by means of the “back” key.

5.4 Sensor S2 serial number

Use the “UP” or “DOWN” keys and select by means of the “ON” key. The sensor S1 model number and serial number are displayed. You can return to the previous menu at any time by means of the “back” key.

Drain temperature limitation
The system has a function to reduce the temperature of drainage water. During the cleaning cycle, if the system detects that the medium temperature is higher than the set temperature, the system operates relay G.OUT, which remains energized until the drainage cycle ends. Energization of relay G. OUT must be employed by the user as a method of reducing the drain water temperature of the device, for example through a valve that injects cold water into the drain. Check the local regulations in force.

Faults
Abnormal operating conditions do not cause the device to stop operating but are shown on the display, making it possible to prevent possible more serious problems (red LED flashing on the front panel). Faults are also recorded in a specific memory zone accessible via Modbus. The fault signal persists until the user performs an alarms/faults reset, operating on the user interface or via Modbus, or when the fault in question is resolved. Contact Caleffi technical service if you are unable to solve the problem unassisted.

	Problem
1	Temperature 1 above maximum value set for drain
2	Temperature below minimum value, risk of frost
3	Pressure above maximum absolute level
4	Temperature above maximum absolute level
5	Discharge air vent blocking condition
6	Filling not completed error
7	Incorrect offset detected
8	Error: no power supply

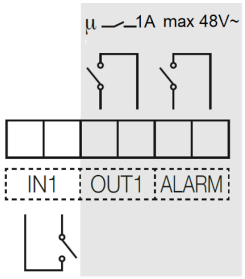
Alarm management
The alarms (or blocking alarms) show conditions that prevent correct operation of the device or conditions of danger for the system. Following identification of a possible hazard condition, the system assumes standby status and remains in a condition of safety to limit any possible damage or malfunctions of the main system. Signalling of the alarm state is provided by the user interface (red LED steady on), and via the alarms signalling relay (ALARM relay, closing), and via Modbus, by means of specific registers that indicate the type of alarm identified. The alarms are recorded in a suitable memory zone and can be read and checked via ModBus. In the case of non-resettable alarms, following the corrective action an “alarms reset” is required to allow the device to perform a loading cycle and assume correct operating status: during this phase, check that there are no anomalous operating conditions.
NOTE: On the main page the error is indicated, e.g. as E01, while in the alarms history only the identification number 01 is shown.

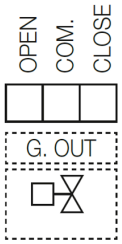
Identification number	**Identifier**	**Cause**	**Corrective action**
E 01	low pressure alarm on sensor 1	system not pressurized (e.g. start up in “no load” condition)	bring the circuit up to pressure, vent the circuit and perform an alarms reset operation
		sensor not inserted correctly	depressurize the system and, in conditions of safety, check the correct insertion of pressure sensor P1, if necessary removing it momentarily and then refitting it in its seat. Clear the alarm with an alarms reset operation.
		low pressure in device	check that any shut-off valves installed upstream from the device are open, check the direction of flow and perform an alarms reset
E 02	low pressure alarm on sensor 2	system not pressurized	pressurize the system and perform an alarms reset.
		sensor not inserted correctly	depressurize the system and, in conditions of safety, check the correct insertion of pressure sensor P1, if necessary removing it momentarily and then refitting it in its seat. Clear the alarm with an alarms reset operation.
E 03	leak alarm	additives filling cap not screwed on correctly	check and restore the seal of the additives filling cap. Perform an alarms reset
		seepage from air vent valve	Temporarily close the air vent valve cap and isolate and empty the device and then replace the dirty air vent valve. Perform an alarms reset.
		seepage from drain ball valve	disconnect the electric supply, isolate and empty the device and replace the drain ball valve. Reconnect the electric supply and perform a device reset.
		generic seepage	check all the seals and tighten wherever possible or restore the seal
E 04	seepage alarm	inlet valve for domestic water washing dirty and seeping.	Close the inlet valve and empty the device. Disconnect the electric supply and close the shut-off valve upstream from the domestic water inlet. Replace the domestic water shut-off solenoid valve. Restore operation of the device and perform an alarms reset

E 05	inlet valve blocked alarm	inlet ball valve stem breakage	empty the device. Disconnect the electric supply. Isolate the system upstream from the strainer. Replace the inlet ball valve. Remake the electrical connections, switch on the electric supply and perform a device reset.
		Check valve dirty or blocked	Isolate and empty the device. Check that P2 does not move downward, otherwise dismantle downstream from the check valve and clean
		drain problem identified as problem on the inlet valve	check efficiency of the drain and that the cooling valve, if present, is not creating back pressure during discharge
		inlet valve force to open	remove valve forcing and perform an alarms reset.
		valves protection fuse has blown	disconnect the device electric supply and check the cables for possible damage, humidity or other anomalous conditions that might have caused the fuse to blow. Change the valves fuse and reconnect the electric supply. Perform an alarms reset
E 07	drain valve blocked open alarm	valve blocked	close the inlet valve. Make sure the device is empty. Contact service to have the valve replaced after disconnecting the electric supply. Restart the system and clear the alarm by performing the alarms reset procedure.
		faulty actuator	contact the service network to have the actuator replaced: isolate and empty the device, disconnect the electric supply, replace the motor, and return the system to operation. Perform the alarms reset.
		fuses fault	disconnect the electric supply and replace the valves protection fuse. Reconnect the electric supply and perform an alarms reset
		complete pressure absence on domestic water.	check presence of pressure on domestic water system and restore correct operating conditions of the system before performing an alarms reset.
E 08	drain valve blocked closed alarm	valve blocked	close the inlet valve. Open the drain manually or remove the auxiliary drain cap. Contact service to have the valve replaced after disconnecting the electric supply. Restart the system and clear the alarm by performing the alarms reset procedure.
		faulty actuator	contact the service network to have the actuator replaced: isolate and empty the device, disconnect the electric supply, replace the motor, and return the system to operation. Perform the alarms reset.
		fuses fault	disconnect the electric supply and replace the valves protection fuse. Reconnect the electric supply and perform an alarms reset
		drain blocked	inspect drain and remove any obstacles that prevent the water from flowing away.
		inlet valve blocked open	perform a check of the inlet valve and, if necessary, assess the possibility of replacing it, contacting technical service.
		domestic water valve open	Perform a check of the domestic water valve and contact technical service.
E 10	error, communication with sensor 1 not possible	sensor disconnected	disconnect the controller electric supply and check correct connection of the terminal and sensor cables. Check that the sensor 1 cable is not damaged or severed. Reconnect the electric supply: the alarm is self-resetting.
E 12	error, communication with sensor 2 not possible	sensor disconnected	disconnect the controller electric supply and check correct connection of the terminal and sensor cables. Check that the sensor 2 cable is not damaged or severed. Reconnect the electric supply: the alarm is self-resetting
E 13	domestic water low pressure alarm	domestic water shut-off valve closed	open the domestic water shut-off valve upstream from the device, if present
		complete absence of line pressure during filling in mode A	check line pressure. Perform an alarm reset to clear the alarm.
		cleaning nozzles clogged	device maintenance can be carried out only by expert personnel: contact Caleffi for instructions.
E 14	air vent blocked	air vent cap tightened in closing direction	unscrew and open the air vent cap. Perform an alarm reset to clear the alarm.
E 15	sensor 1 clip break alarm	sensor 1 erroneously removed during operation of the device	refit the sensor correctly and check correct sealing of the system. Restart the system by means of an alarm reset
		sudden drop of plant pressure due to a hose burst event or another fault	inspect the plant and check that there are no faults or anomalous behaviours such as to result in a drop of plant pressure. Restore the correct static pressure value and restart the system by performing the alarm reset procedure.

E 16	sensor 2 clip break alarm	sensor 2 erroneously removed during operation of the device	refit the sensor correctly and check correct sealing of the system. Restart the system by means of an alarm reset.
		sudden drop of plant pressure due to a hose burst event or another fault	inspect the plant and check that there are no faults or anomalous behaviours such as to result in a drop of plant pressure. Restore the correct static pressure value and restart the system by performing the alarm reset procedure.
E 20	sensor 1 pressure measurement error	sensor internal fault	contact the service network and replace the sensor: to do this, the plant must be de-energised and the device must be emptied. Once the new sensor has been installed, proceed with the alarm reset.
E 21	sensor 1 pressure measurement over range error	surpassing sensor maximum pressure	check correct operation of the plant, of the expansion vessels and of the safety relief valves. Surpassing the sensor maximum pressure values is a very hazardous condition for the plant and for persons: carry out a general check of the plant.
E 22	sensor 1 pressure measurement under range error	sensor internal fault	contact the service network and replace the sensor: to do this, the plant must be de-energised and the device must be emptied. Once the new sensor has been installed, proceed with the alarm reset.
E 26	sensor 2 pressure measurement error	sensor internal fault	contact the service network and replace the sensor: to do this, the plant must be de-energised and the device must be emptied. Once the new sensor has been installed, proceed with the alarm reset.
E 27	sensor 2 pressure measurement over range error	surpassing sensor maximum pressure	check correct operation of the plant, of the expansion vessels and of the safety relief valves. Surpassing the sensor maximum pressure values is a very hazardous condition for the plant and for persons: carry out a general check of the plant
E 28	sensor 2 pressure measurement under range error	sensor internal fault	contact the service network and replace the sensor: to do this, the plant must be de-energised and the device must be emptied. Once the new sensor has been installed, proceed with the alarm reset.
E 23	sensor 1 temperature measurement error	sensor internal fault	contact the service network and replace the sensor: to do this, the plant must be de-energised and the device must be emptied. Once the new sensor has been installed, proceed with the alarm reset.
E 24	sensor 1 temperature measurement over range error	surpassing of maximum temperature of sensor 1 (e.g. device internal temperature above 100°C)	reduce system temperature and perform the plant safety shutdown procedure, checking the adjustment systems and plant safety systems. Excessively high temperatures can damage the device and other components of the plant. Restart the plant after having performed the foregoing checks and corrective actions to guarantee that the maximum temperatures are within the admissible values.
E 25	sensor 1 temperature measurement under range error	sensor internal fault	contact the service network and replace the sensor: to do this, the plant must be de-energised and the device must be emptied. Once the new sensor has been installed, proceed with the alarm reset
E 29	sensor 2 temperature measurement error	sensor internal fault	contact the service network and replace the sensor: to do this, the plant must be de-energised and the device and the plant must be emptied. Once the new sensor has been installed, proceed with the alarm reset.
E 30	sensor 2 temperature measurement over range error	surpassing of maximum temperature of sensor 1 (e.g. device internal temperature above 100°C)	reduce system temperature and perform the plant safety shutdown procedure, checking the adjustment systems and plant safety systems. Excessively high temperatures can damage the device and other components of the plant. Restart the plant after having performed the foregoing checks and corrective actions to guarantee that the maximum temperatures are within the admissible values.
E 31	sensor 2 temperature measurement under range error	sensor internal fault	contact the service network and replace the sensor: to do this, the plant must be de-energised and the device and the plant must be emptied. Once the new sensor has been installed, proceed with the alarm reset.

Actuation relays
The board features the auxiliary replay contacts used to control auxiliary equipment and alarms.



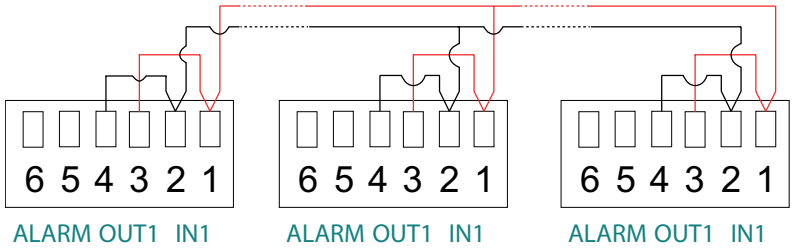


IN1 input relay for voltage free contact. When the contact is closed, strainer cleaning is inhibited
OUT1 relay output N.A. The contact closes when the strainer is in the cleaning phase (max 48V,1A)
ALARM relay output N.A. for alarms indication (48V, 1A max)
G. OUT output for control of cold water injection valve on drain (max 5(2)A 250V). The relay can drive a motorised diverter valve with 3-contact command.

Actuator relay status summary table:

	MAINS LOSS	SIGNAL ACTIVE
OUT1	Open	Closed
ALARM	Open	Closed

Operation in parallel
Two or more strainers can be connected in parallel to increase the filtration capacity of the system, in cases in which there is no bypass provided and the application calls for continuous service. Make sure however, that the cleaning phase does not occur at the same time. For this reason, if it is detected that another device connected to the strainer is in the active phase, the system waits until the device in question is no longer operating. For simple hook-up of the parallel connection of multiple devices (up to a maximum of 10), the following wiring diagram can be used:

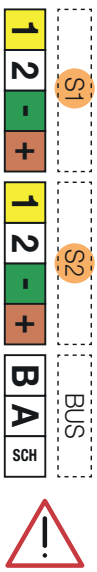


With this connection, if one of the dirtmagclean units performs a cleaning cycle or assumes alarm status, a flashing "I" message will be shown on all the devices and cleaning of the other strainers is inhibited until the device, in cleaning status or alarm mode, resumes its normal operation or filtration.

This connection can be made using a shielded twisted pair with minimum conductor size of 0.5 mm^2 . Maximum length of connections between one device and another is 2.95 m. The cable must be routed through data trunking carrying only very low voltage cables. During operation, with a direct connection between OUT1 and IN1, when a controller performs a cleaning cycle, its display shows a flashing “I” message to indicate that contact IN1 is closed.

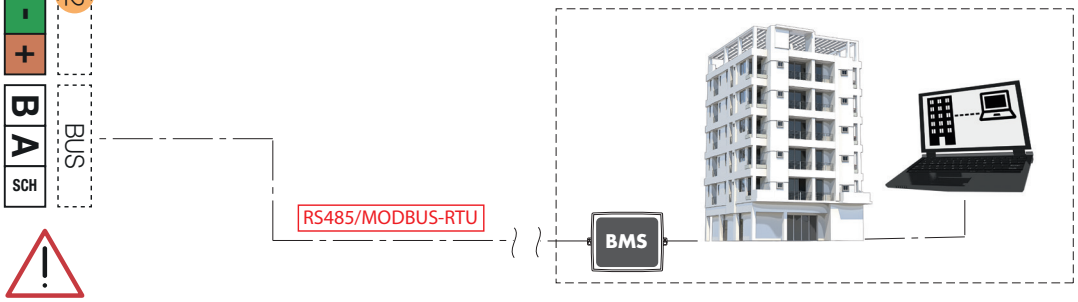
IMPORTANT! Comply with the wiring diagram and do not invert connections 1 – 2 from one device to the next.
Operation not recommended in the case of activation of the cleaning cycle by means of Δp. Enabling preferable via programmed cleaning; in the case of an electric supply loss of one of the strainers it is not possible to guarantee correct operation of the system: the other strainers will be inhibited.

Remote control via MODBUS
Make the connection using the “BUS” terminals:



Transmission

Protocol type	BUS	Baud Rate	Data bit	Parity	Stop bit	Handshake	Unit Load
MODBUS-RTU	RS-485	9600	8	EVEN	1	None	1/8 UL



MODBUS functions:

Function 0x03 - Read Holding Registers
Used to read one or more parameters (the size of every parameter is 16 bit)
The frame has the following structure:

dev. Addr.	func	start addr H	start addr L	N.regs H	N.regs L	CRC16H	CRC16L
HH	03	HH	HH	00	HH	HH	HH

dev. Addr. – Address of the device on the RS485 net (1-250)
Func – Function code = 3
start addr H - MSByte of the address of the parameter:
start addr L - LSByte of the address of the parameter
N.regs H - MSByte of the number of registers to read (always 0)
N.regs L - LSByte of the number of registers to read
CRC16H - MSByte of CRC16
CRC16L - LSByte of CRC16
If during a multiple reading request, is specified a not allowed quantity of registers, the device will answer with an exception code 0x02 (ILLEGAL DATA ADDRESS).

Function 0x06 - Write Single Register
Used to write a single parameter (16 bit)
The frame has the following structure:

dev. Addr.	func	Reg. addr H	Reg. addr L	Reg. val. H	Reg. val. L	CRC16H	CRC16L
HH	06	HH	HH	HH	HH	HH	HH

dev. Addr. - Address of the device on the RS485 net (1-250)
Func - Function code = 6
Reg. addr H - MSByte of the address of the parameter
Reg addr L - LSByte of the address of the parameter
Reg. val. H - MSByte of the value of the parameter
Reg val. L - LSByte of the value of the parameter
CRC16H - MSByte of CRC16
CRC16L - LSByte of CRC16
The specified value is not accepted (exception code 2) if it is not consistent with the parameter range or if it is not consistent with the current state of the device (e.g. day = 31 rejected if month = 4, month = 4 rejected if day = 31).

Register name	Address (DEC)	Description	R	W	MIN	DEFAULT	MAX	Description of BIT	Data type
MON0000	0	Device model, represented with a 16-bit integer.	1	0					U16
MON0001	1	Device communication address or IDB, represented with an 8-bit number.	1	0					U8
MON0002	2	Temperature measurement 1 in tenths of a degree, represented with a 16-bit integer.	1	0					U16
MON0003	3	Temperature measurement 2 in tenths of a degree, represented with a 16-bit integer.	1	0					U16
MON0004	4	Device model number, represented with a 16-bit integer.	1	0					U16
MON0005	5	Device serial number, represented with a 16-bit integer.	1	0					U16
MON0006	6	Measurement of delta pressure as (pressure 1 - pressure 2) in tenths of a KPa, represented with a 16-bit integer with sign.	1	0					I16
MON0009	9	Active alarm flags status represented with 16-bit integer, with the following meaning	1	0				bit 0 : no pressure on sensor 1 alarm bit 1 : no pressure on sensor 2 alarm bit 2 : leak detection alarm bit 3 : seepage detection alarm bit 4: inlet valve blocked alarm bit 5: undefined bit 6: drain valve blocked open alarm bit 7: drain valve blocked closed alarm bit 8: measurement error alarm on sensor 1, alarm with automatic alarm reset bit 9: sensor 1 not correctly connected alarm, with automatic alarm reset bit 10: measurement error alarm on sensor 2, alarm with automatic alarm reset bit 11: sensor 2 not correctly connected alarm, with automatic alarm reset bit 12 : domestic water low pressure alarm bit 13: air vent blocked alarm bit 14: sensor 1 clip break alarm bit 15: sensor 2 clip break alarm	U16
MON0011	11	status of the system faults flag represented with a 16-bit integer	1	0				bit 0: temperature 1 above maximum value set for drain bit 1: temperature below minimum value, risk of frost bit 2: pressure above maximum absolute level bit 3: temperature above maximum absolute level bit 4: discharge air vent blocking condition bit 5: filling not completed error bit 6: pressure falling bit 7: cleaning not successful error bit 8: cleaning skipped error due to power loss	U16
MON0017	17	Day of the current week, represented with an 8-bit integer.	1	0					U8
MON0022	22	software version of the device, represented with an 8-bit integer.	1	0					U8
MON0023	23	software version of the device, represented with an 8-bit integer.	1	0					U8
MON0024	24	device firmware checksum, represented with a 16-bit integer	1	0					U16

MON0025	25	status of command outputs, represented with an 8-bit integer.	1	0				Bit 0: motor command Bit: 1 drain valve command Bit: 2 domestic water valve command Bit: 3 inlet valve command Bit: 4 cooling output command Bit: 5 inhibition output command Bit: 6 alarm output command Bit: 7 voltage free output command	U8
MON0027	27	status of inputs, represented with an 8-bit integer.	1	0				Bit: 0 inhibition input status	U8
MON0030	30	number of cleaning cycles performed by the device, represented with a 16-bit integer	1	0					U16
MON0031	31	alarm code present on device, represented with an integer	1	0				Alarm identification code: 1: low pressure alarm on sensor 1 2: low pressing alarm on sensor 2 3: leakage alarm 4: seepage alarm 5: inlet valve blocked alarm 7: drain valve blocked open alarm 8: drain valve blocked closed alarm 10: error, communication with sensor 1 not possible 12: error, communication with sensor 2 not possible 13 : domestic water low pressure alarm 14: air vent blocked alarm 15: sensor 1 clip break alarm 16: sensor 2 clip break alarm 20: sensor 1 pressure measurement error 21: sensor 1 pressure measurement over range error 22: sensor 1 pressure measurement under range error 23: sensor 1 temperature measurement error 24: sensor 1 temperature measurement over range error 25: sensor 1 temperature measurement under range error 26: sensor 2 pressure measurement error 27: sensor 2 pressure measurement over range error 28: sensor 2 pressure measurement under range error 29: sensor 2 temperature measurement error 30: sensor 2 temperature measurement over range error 31: sensor 2 temperature measurement under range error	U8
PA0000	1000	Current day (from 1 to 31).	1	1	1	1	31		
PA0001	1001	Current month (from 1 to 12).	1	1	1	1	12		
PA0002	1002	Current year (from 18 to 99).	1	1	18	18	99		
PA0003	1003	Current time.	1	1	0	0	23		
PA0004	1004	Current minutes.	1	1	0	0	59		
PA0005	1005	Device communication configuration bit.	1	1	0x00	0x03	0xFFFF	bit 0 : enable communication with MODBUS protocol 0 = communication not enabled bit 1 = communication enabled bit 1: communication parity enabling 0 = parity not enabled 1 = parity enabled bits 2-7: undefined	
PA0006	1006	Language selection	1	1	0x00	0x00	0x03	00 = IT 01 = EN 02 = FR 03 = DE	

PA0008	1008	Bit mask for days of week enabled for cleaning.	1	1	0x00	0x00	0x7F	Depending on the cleaning period setting, the register may have different definitions and contents. Daily period: register is not used because cleaning is enabled every day. Weekly period: register assumes meaning of mask of days enabled for cleaning. Meaning of the configuration register bits (1=enabled,0=disabled): bit 0: Monday Enabling of disinfection bit 1: Tuesday Enabling of disinfection bit 2: Wednesday Enabling of disinfection bit 3: Thursday Enabling of disinfection bit 4: Friday Enabling of disinfection bit 5: Saturday Enabling of disinfection bit 6: Sunday Enabling of disinfection bit 7: undefined Two-weekly period: the register assumes the meaning of the number of the day of the two weeks enabled for cleaning (1-14). Monthly period: the register assumes the meaning of the date of the month enabled for cleaning (1-28).	
PA0009	1009	Cleaning start minute.	1	1	0	59	59		
PA0010	1010	Cleaning start hour.	1	1	0	23	23		
PA0013	1013	Maximum pressure delta in tenths of a KPa	1	1	100	150	5000		
PA0017	1017	Number of sleep weeks	1	1	0	4	30		
PA0018	1018	Maximum drain temperature in degrees.	1	1	30	50	80		
PA0034	1034	Maximum pressure delta per initial cleaning cycle in tenths of a KPa	1	1	10	200	5000		
PA0036	1036	pressure offset for sensor 1 in tenths of a Kpa.	1	1	-2000	0	2000		
PA0037	1037	pressure offset for sensor 2 in tenths of a Kpa.	1	1	-2000	0	2000		
PA0039	1039	duration of initial cleaning cycle period in hours.	1	1	24	24	480		
CMD0000	2000	cleaning start command	1	1	0		1		
CMD0001	2001	additives supply start command	1	1	0		1		
CMD0002	2002	device sleep phase start command	1	1	0		1		
CMD0003	2003	device sensors control enabling command	1	1	0		1		
CMD0004	2004	initial cleaning cycle enabling command	1	1	0		1		
CMD0010	2010	alarm and fault condition reset command.	1	1	0		1		
CMD0011	2011	command to reset the fault conditions identified.	1	1	0		1		
CMD0023	2023	device reset command	1	1	1		1		