





# HANDLING AND CONTROL MANUAL DFLEX SERIES

MMCSX-EN-21-2

In compliance with the European Union regulations on the Safety of Machines, you must read these instructions carefully before installing the equipment.



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#### 1. Introduction.

The FISAIR DFLEX series dehumidifiers have moving operating parts, such as two fan motors (supply and reactivation) and a gear motor driving the desiccant wheel; and variable static operating parts, such as air heaters/coolers, filters and flow control devices.



The integration of the programmable logic controller S7-1200 in the dehumidifier management and operational supervision provides faster, simpler, more accurate and more reliable operation of the dehumidifier, while reducing electrical panel accessories.

The S7-1200 PLC controlling this type of equipment is a programmable device for the configuration, setting and monitoring of the different equipment components connected in real time. The equipment is operated from its own display or from a remote device.

# The Electrical Diagram should be kept along with this manual

The automatic program is designed so that the execution, actions and/or reactions produced by the machine and its surroundings do not affect the level of safety and functionality the machine is built for, while also observing the electromagnetic compatibility directive.

Any removal and/or modification of the program contained in the PLC, operated from its own display or an online PC, will modify the guarantee conditions, as well as compliance with the directives and explicit rules covering its manufacture. The installer, handler or user will then be responsible for the repercussions of the changed functionality of the device.

The programmed device does not interfere with safety against personal injury; the following examples of passive safety components are installed for this purpose:



#### 2. DFLEX operating instructions

- a) Flow control or motor fan process air pressure control.
- b) Remote ON/OFF of fan motors.
- c) Remote ON/OFF drive gear motor of the desiccant wheel.
- d) Reactivation battery RB control. Regulating the reactivation battery RB controls the equipment drying capacity (see user manual).
  - Manual mode, at 100% power.
  - Automatic mode:
    - Configuration by "S" stages via two external digital signals.
    - Proportional configuration "P" via a 0..10V DC analogue signal from an external regulator.
    - Configuration by measurment signal "M". By means of a humidity probe SH1 (0..10V DC).
- e) Pre-heating battery control:
  - ➢ Via the temperature probe ST0 (0-10Vcc).
- f) Pre-cooling battery control:
  - ➢ Via the temperature probe ST3 (0-10V DC).
- g) Post-cooling battery and post-heating battery control:
  - ➤ Via the temperature probe ST2 (0-10V DC) or ST4 (0-10V)



- h) Measurement and supervision:
  - > Temperature of the reactivation air measured by the probe (ST1).
  - Process air temperature measured by the probe (ST0) after the pre-heating battery.
  - Process air temperature measured by the probe (ST3) after the pre-cooling battery.
  - Process air temperature measured by the probe (ST4) after the postcooling battery.
  - Process air temperature measured by the probe (ST4) after the postheating battery.
  - > Synopsis of component operation screen.
  - Monitoring the proportional modulation of the BR (power delivered by the reactivation battery BR).
  - > Monitoring the power delivered by the pre-heating battery.
  - Monitoring the power delivered by the pre-cooling battery.
  - Monitoring the power delivered by the post-cooling battery.
  - > Monitoring the power delivered by the post-heating battery.
  - Humidity measurements (relative, absolute, dew point or mixing ratio) and temperature measured by the probe SH1-ST2 to be installed in the process air inlet or return.
  - Humidity and temperature measurements by the probe SH2-ST4 to be installed in the dry air supply.
  - Monitoring humidity set point.
  - > Monitoring maximum humidity alarm set point.
  - Minimum reactivation air flow of and rotor rotation.
- i) Safety and alarms:
  - Timing at the disconnection of the humid-air motor fan and the gearmotor for cooling the equipment.
  - > Alarm and equipment shutdown due to lack of air in the reactivation.
  - Alarm and equipment shutdown due to lack of rotation of the desiccant rotor.
  - > Alarm and equipment shutdown due to triggering any motor thermal cut-off.
  - Alarm and equipment shutdown due to triggering electrical protective devices of the heaters.
  - > Alarm and heater shutdown due to excessive SSR temperature.
  - > Alarm for blocked process and reactivation filters (if applicable).
  - Alarm and BR heater shutdown due to excessive reactivation temperature as measured by probe ST1.
  - Post heating heater shutdown due to excessive temperature as measured by operating thermostat TF3. To be reset manually.



3. Control panel and navigation keyboard of the PLC.



I1. Break switch.

I2. MANual / 0 / AUTomatic selection switch

**PLC**. Programmable logic controller 4.3" projected resistive panel type touch screen with the following functions:



The following screen shows the icons that can be pressed at any time while operating the touch screen interface:



\*For technical services.



#### 3.1 Login and user levels

Press the user selection to log in.

Session close time: All user levels have a session close time of 15 minutes. You will need to log in again after these 15 minutes.

Login		×
User	r: d:	
	Cancel	ок

#### **User levels**

Login level***	Password***	Permission granted
No login	-	-
User	Electrical diagram no.* <u>Example:</u> Electrical diagram: E10776 Password: 00010776	<ul> <li>Access to fan regulation selection by flow (Q) or pressure (P).</li> <li>Access to local or remote operation mode configuration.</li> <li>Access to Q/P set-point adjustment</li> <li>Access to H3 and Hx RH maximum deviation Alarm set-point adjustments.</li> <li>Access to pre and post heating or cooling batteries set-point adjustments.</li> </ul>
Technician	Configurationprogramnumber**Example:Program PC20210468Password: 00210468	<ul> <li>In addition to the permissions of the previous level:</li> <li>Access to modification of factor "K" and "Qmax" in the fan regulation selection</li> <li>Access to Tmax, Pmax and Tunning.</li> </ul>
Developer	For programmer.	All the permissions of the previous levels.

\*Complete with 0 to the left up to 8 digits. \*\*Only the 6 numbers on the right.

\*\*\*Case sensitive



#### 4. Modes of operation

The unit can operate in two operating modes in which the reactivation battery power output is managed differently.

The unit's drying capacity is controlled by managing the reactivation battery. (See installation and maintenance manual)

There follows an explanation of the unit's operating modes:

#### 4.1 Manual mode

If manual mode (MAN) is selected, the fan motors, speed reducer motor that turns the rotor and the reactivation battery will start up immediately at 100% of their power output.

If the equipment has additional batteries, you must enter the required set points in the settings menu for proper operation.

#### 4.2 Automatic mode

In automatic mode (AUTO) the start-up of the fan motors and the speed reducer motor depends on the H1 interlock and the operation of the reactivation battery is contingent on the configuration of the control and interlock H2.

There are three control configuration types for the operational management of the reactivation battery RB.

#### • Configuration by stages "S"

By means of two external digital signals, the reactivation battery is controlled with two interlocks: H2 and H3. Each stage delivers an adjustable percentage of power.





- Functionalities of the Hn interlocks in configuration by stages "S".
  - Interlock H1 (X1.1I<sup>+</sup>/27 terminals): ON/OFF remote ventilation and rotor connection.
  - Interlock H2 (X1.1I<sup>+</sup> /28 terminals): Connection of the RB first phase Requires connection H1.
  - Interlock H3 (X1.1I<sup>+</sup>/29 terminals): Connection of the RB second phase.

#### • Proportional Configuration "P":

By means of an external regulated analogue signal 0...10V DC from a humidity controller/regulator a power output of 0...100% is obtained, supplied by the reactivation battery RB.

This signal must be connected to the terminals 0A-A1. (See the associated electrical diagram).

REGULADOR PROPORCIONAL





- Functionalities of the Hn interlocks in proportional configuration "P".
  - Interlock H1 (X1.1I<sup>+</sup>/27 terminals): ON/OFF remote ventilation and rotor connection.
  - Interlock H2 (X1.1I<sup>+</sup> /28 terminals): Reactivation battery ON/OFF connection. Requires connection H1.
  - Interlock H3 (X1.1I<sup>+</sup>/29 terminals): Not applicable in configuration "P".



#### • Configuration by Measurement signal "M":

Using the humidity probe SH1/SH2, the PLC regulates the power delivered by the reactivation battery to reach the established set point.

The applicable humidity ranges for the probe to be connected are as follows:

- Relative humidity (RH): [0...100%] // [0...10V DC]
- Absolute humidity (Hx): [0...20g/kg] // [0...10V DC] (\*)
- Dew point (Tdp): [ranges according to specification] (\*)

The SH1 probe must be connected to the X1.A1/A2 terminals. (See the associated wiring diagram).

The SH2 probe must be connected to the X1.A4/A5 terminals. (See the associated wiring diagram).

The required humidity (HR/Hx/Tdp) set point and the differential for the maximum permissible humidity alarm are entered in the settings menu.

The humidity alarm will be visible and will flash on the main screen when the value measured by the SH1/SH2 probe is higher than the sum of the setpoint and the humidity alarm.

REGULADOR PID



- Functionalities of the Hn interlocks in proportional configuration "P".
  - Interlock H1 (X1.1I<sup>+</sup>/27 terminals): ON/OFF remote ventilation and rotor connection.
  - Interlock H2 (X1.1I<sup>+</sup> /28 terminals): Reactivation battery RB ON/OFF connection. Requires connection H1.
  - Interlock H3 (X1.1I<sup>+</sup>/29 terminals): Not applicable in configuration "M".

(\*) Requires specific application



#### 4.3 Control of additional batteries

#### • Anti-freeze pre-heating coil control: Water battery

By means of the temperature probe ST0, the PLC set the control of the MV2 valve in all or nothing. The opening of the motor-valve actuator can be adjusted by reducing the limit value of the analog output signal to reduce energy consumption depending on the expected thermal jump compared to the outside air temperature.



To adjust the pre-heating air temperature setpoint, go to point 5.2 settings - screen 2 Pre-Post units.

#### • Pre-cooling battery control:

Using the temperature probe ST3, the PLC regulates the capacity of the precooling battery to reach the set point.

The temperature probe must be connected to terminals regarding the associated electrical diagram. As a general rule, the ST3 probe is installed in the BF1 and connected according to factory settings.

The desired temperature set point is entered in the settings menu (AJUS) under T3.

The temperature range of the probe to be connected must be  $[0^{\circ}C...+50^{\circ}C] // [0...10V DC]$ .





#### • Post-cooling battery and post-heating battery control:

Using the temperature probe ST4, the PLC regulates the power delivered by the post-cooling battery and post-heating battery to reach the adjusted set point.

There are two combined probes option:

The combined probe SH2-ST4 must be installed in the dry air supply.

The combined probe SH1-ST2 must be installed in the return air or in the room.

The desired temperature set point is entered in the settings menu under T4.

The temperature range of the probe to be connected must be [0°C...+50°C] // [0...10V DC].



REGULADOR PID



### 5. Initial state

Having fulfilled the conditions for installation, checked that the network values match those required for the machine and having made all of the electrical connections in accordance with the control application:

Arm the switch (I1), and the following will appear on the control panel:







Initial state OK.

Signalling card SEF-008

Remote signalling card SEF-013





Initial state NOT OK. Signalling card SEF-008 The lower alarm button

Remote signalling card **SEF-013** 

flashes yellow to indicate an

alarm

On the signalling card SEF-008 iights up yellow, indicating that the unit is "live".

If there is any alarm/defect/fault in the unit, (will also light up red, indicating "warning".

lights up green, which indicates that the unit is When the unit is switched on, "running".

WARNING!!! Do not switch on the unit without first reading sections 5.1 and 5.2.



The unit has a remote signalling card SEF-013 with three relays (NC-NA) with which we can obtain these remote status signals. This card is located inside the unit's electrical board, in connection block X1.

- Rx1. Remote relay indicating "unit is live"
- Rx2. Remote relay indicating "running" Rx3. Remote relay indicating "defect/alarm"

See the associated electrical diagram for its electrical connection.



#### 5.1 Configuration menu

#### **Operation mode configuration :**

If you have chosen to operate in automatic mode, you must select from the configuration menu one of the three pre-set configurations for operating the dehumidifier.

- Stages
- Proportional
- Measurement

For detailed information on the configuration, see section 4.2.

Selection of "S" stages configuration

SIEMENS	SIMATIC HMI
CONFIGURATION	Ра нз
ON STAGES	
	IONAL
MEASURE	
	>>
F1 F2	F3 F4



Selection of "P" proportional configuration

SIEMENS	SIMATIC HMI
CONFIGURATION	
OFF STAGES	
ON PROPORT	
A î 🧣 🔺	>>
F1 F2	F3 F4

Selection of configuration by measurement signal "M"





#### Fan control configuration

The default control mode is Flow, the air intakes of SQ1 being arranged for this type of control. After following the steps in the User Manual (MUSX) to measure pressure, you can change the control mode in this menu.

It should be noted that if you change the control mode, you must change the air intakes of the SQ1 differential pressure transmitter. Refer to DFLEX Series User Manual section 9.9 for detailed explanation.

Access the following screen to select Q or P.

Pressing the key gives the following screen to select process fan control by flow or pressure:

SIEMENS	SIMATIC HMI
II OFF Pressure Con	ntrol
ON II Flow Contro	
Maximum Flow P	Process Fan: 1500m3/h K Factor: 95
	<< >>
F1 F2	F3 F4

In the flow control option, the maximum process fan flow and the K factor value are set.

- Maximum Flow-10M1: The maximum flow limit [m3/h] allowed in the settings menu is set.
- Factor K-10M1: The conversion factor K is set for the flow calculation according to the process motor technical data sheet.

**IMPORTANT:** The **user level** is sufficient to **select flow or pressure control** and the **technician or developer level** is required to **configure Q max**, maximum fan flow and the **factor K**. See section 3.1 "Login and user levels".



#### Local or remote computer control configuration:





key, brings up the following screen:

SIEMENS	SIMATIC HMI	
CONFIGURATION		H
II OFF LOCAL		
	rious Tasks <<	
F1 F2	F3 F4	

For dehumidifiers with a communications gateway, local or remote configuration can be selected for control:

- Local: Accepts local start-up orders and the instructions entered in each of the interface screens.

- **Remote:** Accepts start-up orders and instructions by transmitting data through the communication bus.

**IMPORTANT:** A user level login is sufficient to select equipment control locally or remotely.

The various tasks button allows access to the PLC input and output supervision application (see section 6.5)

Diagram 1 shows a summarised machine operation.

#### Diagram 1: Mode selection process





#### 5.2 Adjustments menu

In the adjustments menu (AJUS) you must enter the required setpoint values according to the operating mode and configuration selected.

#### SETTINGS: SCREEN 1: PRE-POST UNITS

SIEMENS	SI	MATIC HN	11
SETTINGS			-
	Proportion of H3:	0%	
Set-Poi	nt Relative Humidity:	100%	
Maximum	Deviation HR Alarm:	5%	<b>F</b>
	Tmax:	135°C	
	Pmax:	100%	
	Tunning:	100%	
	A		
E1	E2 E3	E4	
	FZ F3	Γ4	

#### Apply in "S" stages configuration

The reactivation battery is controlled with the interlocks H2 and H3 in two stages:

 Proportion of H3: In H3 the desired second stage power percentage is adjusted; hence. the first stage percentage is: H2 = 100% - H3

#### Apply in measurement signal configuration "M":

- **Relative Humidity set point:** Sets the desired Relative humidity adjustment.
- **RH maximum deviation Alarm:** Enter the differential margin for maximum humidity alarm next to the icon. The alarm is tripped in the main synoptic when the value measured by the humidity probe is higher than the sum total of the SH1 humidity setpoint and the humidity alarm

#### Tmax and Pmax:

- **Tmax:** The maximum temperature that can be reached by the reactivation coil measured from probe ST1 is entered.
- **Pmax:** The maximum power for the reactivation battery is entered. After regulation.
- **Tunning:** The maximum power for the reactivation Battery is entered. Before regulation.



#### SETTINGS: SCREEN 2: PRE-POST UNITS (optional)

SIEMENS	:	SIMATIC	HMI
SETTINGS			_
	T0 Set-Point:	0.0°C	
	OFFSET	0.0°C	
	HYSTERESIS	0.0°C	9
	T4 Set-Point:	0.0°C	
	T3 Set-Point: [	0.0°C	- 1
🛉 🛉 🚳 🛣	]	<<	>>
F1 F2	2 F:	3 F	4

#### Applies if the equipment has additional batteries

- T0: Set the desired temperature vaule for the pre-heating antifreezing battery.
- Hysteresis: Set T0 Set-point value + [upper activation margin]. (avaiable for antifreezing batery)
- Offset: Set T0 Set-point value [lower activation margin]. (avaiable for antifreezing battery)



- T3: Set the desired temperature value for the pre-cooling battery
- T4: Set the desired temperatura value for the post-cooling ando post-heating battery.

**IMPORTANT:** This screen appears only if you have pre-cooling/heating or post-cooling/heating coils.

**IMPORTANT:** Only the set points for the coils present in the system appear: T0 and/or T3 and/or T4.



#### SETTINGS: SCREEN 3: PROCESS FAN REGULATION

#### Fan control (only available with plug fans installed)

Depending on the control pre-selection by flow or pressure, select the set point in the configuration menu:

• Flow set point-10M1: Enter the desired flow value [m3/h] for the process fan.

SIEMENS	SIMATIC HMI
SETTINGS	_
Process Far	Flow Setpoint: 1500m3/h
	<<
F1 F2	F3 F4

• **Pressure set point-10M1:** Enter the desired pressure value [Pa] for the process fan.





#### 6. Commissioning

Once the I1 break switch has been armed, the setpoints have been entered in the adjustments menu and the configuration has been selected (in AUTO mode only), toggle the I2 switch in the required position.

#### 6.1 Manual mode selection



#### 6.2 Automatic mode selection





#### 6.3 Shutdown

To stop the device manually, set switch I2 to position 0.

The PLC is programmed to include an operation delay on the reactivation fan and the speed reducer motor for 5 minutes to dissipate the heat from the reactivation battery, preventing its thermostatic protection from being triggered or any overheating due to radiation.

MAN -0- AUTO	The reactivation fan and the rotor will continue to work for 5 more minutes to dissipate the heat.
MAN -O- AUTO	If the equipment incorporates a post-heating battery BC2: The operating delay also extends to the process fan.

#### 6.4 Emergency stop

In the case of a serious defect that could cause personal injuries or irreparable damage to the unit, the electric power supply must be cut off using the cut-off switch I1.

WARNING!!! <u>Under no circumstances must the I1 cut-off switch be used for a controlled shut-down</u>. This could damage components of the machine and affect its programming.

It must be born in mind that the 5 minutes' delay of the fan shut-down and speed reducer motor are eliminated to cool the unit down.



#### 6.5 PLC Inputs and outputs check

Pressing the various tasks button located on the configuration screen: Local/Remote (see configuration section 5.1), the following screen appears:



Press start check to acces to the following screen:



This screen gives access to the supervision screens of the digital and analog inputs and outputs. All DFLEX series optional possible inputs and outputs are shown. If the particular equipment does not have any of them, it is shown on the screen but it will not show its activation status (see the particular wiring diagram).

![](_page_27_Picture_1.jpeg)

#### **Digital inputs**

The active digital inputs are shown, according to the wiring diagram nomenclature.

SIEMENS	SIMATIC HMI
MENU CHECK  TO.0 TO.1 TO.2 TO.3 TO.4 TO.5 TO.6	DIGITALS INPUTS O 10.7 O 11.0 O 11.1 O 11.2 O 11.3 O 11.4 O 11.5
F1 F2	F3 F4

#### Analog inputs

The proportional 0-10 Vdc value of the analog inputs is displayed

SIEMENS	SIMATIC HM	I
MENU CHECK	ANALOGS INPUTS	
0.0V IW64		2
0.0V IW66		
0.0V IW96		Ì
0.0V IW98		
0.0V IW100		
0.0V IW102		
F1 F2	F3 F4	

![](_page_28_Picture_1.jpeg)

#### **Digital output**

The application's digital outputs are enabled or disabled by clicking on each of them.

SIEME	NS	SIMATIC HMI	
ME		DIGITALS OUTPUTS	E
ON	Q0.1	ON Q0.6	S
ON	Q0.2	ON Q0.7	£
ON	Q0.3	ON Q1.0	
ON	Q0.4	ON Q1.1	
ON	Q0.5	RPH Calculation	
F1	F2	F3 F4	

Pressing the RPH calculation button the following screen apears:

SIEMENS	SIMATIC HMI
RPH Calculation Desiccant	Rotor
Number of Rad 0 radios Twist Detector.	RPH: 0 rph
F1 F2	F3 F4

This screen activates the rotor spin showing his number of revolution per hour. It is necessary to indicate the number of spokes that the rotor has depending on the size of the equipment.

![](_page_29_Picture_1.jpeg)

#### Analog outputs:

Enter the 0-10 Vdc proportional value to activate the analog outputs.

SIEMENS	SIMATIC HN	ЛІ
MENU CHECK OV QW96. OV QW98. OV QW100 OV QW102	ANALOG OUTPUTS	TOUCH
F1 F2	F3 F4	

![](_page_30_Picture_1.jpeg)

#### 7. Supervision menu

Menu displaying the operation of the main components, the temperature and humidity values and the unit's incidents or alarms on the main screen.

The following diagram shows a standard DFLEX unit with all its available options:

![](_page_30_Figure_5.jpeg)

The flashing arrows indicate the operation of the process (dry air) fan motor, of the speed reducer motor (rotor spin) and of the reactivation fan motor (moist air).

In the event of an incident or alert in the unit, a warning triangle will appear. For the alarm origin and the recommended action, see section "List of equipment alarms".

![](_page_30_Picture_8.jpeg)

The following table describes the components shown in the diagram:

**IMPORTANT:** When the equipment does not have SHx1/ST2 (18 and 19 terminals) or SHx2/ST4 (25 and 26 terminals) combined humidity/temperature probe, the terminals corresponding to the probe, must be -short-circuited to 1L- line

If you want to connect a probe to have a reading in the system, you must connect this probe to the terminals corresponding to the probe, previously removing the short circuits to 1L-.

![](_page_31_Picture_1.jpeg)

The short-circuit made from the factory are shown: (in case of not having SHx1/ST2 or SHx2/ST4 probes)

![](_page_31_Figure_3.jpeg)

![](_page_32_Picture_1.jpeg)

ID	DESCRIPTION
[ST1] [4]	The reactivation battery temperature [4] measured by the probe [ST1] appears in the flow line of the screen.
[SH1]-[ST2].	The measured humidity and temperature values are measured by the combined probe [SH1/ST2]. This probe measures temperature and relative or specific humidity, depending on the chosen unit (provided the configuration chosen beforehand is "M")
	If the value the humidity measured by the probe is higher than the sum total of the set point and the alarm entered in the adjustments menu, a bell-shaped icon will flash on the screen (maximum humidity alert).
	This probe must be installed in the process air inlet or return.
[4]	The bar located in the upper right part of the supervision menu indicates the percentage of power delivered by the reactivation battery [4].
[SH2]-[ST4]	<b>Optional*:</b> The temperature and relative humidity values measured by the combined temperature and relative humidity probe [SH2/ST4] are displayed.
[6]	<b>Optional*:</b> The pre-cooling coil operation is monitored [6]. The signal value applied to the actuator is displayed.
[7]	<b>Optional*:</b> This screen displays the post-cooling coil operation being monitored [7]. The signal value applied to the actuator is displayed.
[5]	<b>Optional*:</b> This screen displays the pre-heating coil operation being monitored [5]. The signal value applied to the actuator is displayed.
[8]	<b>Optional*:</b> This screen displays the post-heating coil operation being monitored [8]. The signal value applied to the actuator is displayed.
[ST3]	The displayed temperature is measured by the probe [ST3].
[SQ1]	<b>Optional*:</b> The dry air flow rate is also shown [Q/P1]. If the pressure control is selected in the settings menu, the pressure value will be seen in Pascals.

![](_page_33_Picture_1.jpeg)

ID	DESCRIPTION
[9] [10]	<ul> <li>Optional*: If the filter has a pressure switch, the set point will be entered in the same switch (the differential pressure value is not displayed): <ul> <li>Clean filter → Blue</li> <li>Clogged filter → Red</li> </ul> </li> <li>Optional*: The differential pressure value measured by the differential pressure switch is displayed if the filter has a pressure transmitter installed. This option can be installed on filters ΔP1 (process input [9]), ΔP2 (reactivation input [10]), ΔP3 (process output [11], not shown in the diagram)</li> </ul>
[MV2] [MV3] [MV4] [MV5]	<ul> <li>The analogue output values (010V DC) are seen for the PLC to control:</li> <li>Optional*: [MV2] pre-heating battery motor valve.</li> <li>Optional*: [MV3] pre-cooling battery motor valve.</li> <li>Optional*: [MV4] post-cooling battery motor valve.</li> <li>Optional*: [MV5] post-heating battery motor valve.</li> </ul>

### **Optional\*: See product description (User manual)**

Pressing the

key, brings up the following screen:

It shows the system inputs:

>>

SIEMENS	SIMATIC HMI
Supervision	TO
H1: OFF	H3: ① OFF
H2: OFF	A1: +0.0V
<b>À Ì &amp; A</b>	<< >>
F1 F2	F3 F4

Displays the status of the H1, H2 and H3 interlocks The external analogue signal value can be shown (A1...)

![](_page_34_Picture_1.jpeg)

The analogue output values (0...10V DC) are seen for the PLC to control:

- Optional\*: Motor valve of the steam or gas reactivation coil BC1
- **Optional\*:** pre-heating battery motor valve.
- **Optional\*:** pre-cooling battery motor valve.
- **Optional\*:** post-cooling battery motor valve.
- **Optional\*:** post-heating battery motor valve.
- **Optional\*:** Process fan when it is a Plug Fan type (flow/pressure regulation)

![](_page_35_Picture_1.jpeg)

#### 8. Information menu.

The (INF) Information Menu gives inforation about main component operating time (hours counter) to facilitate maintenance guidelines:

10M1: process air fan

12M1 / 13M1: Reactivation air fan / Rotor rotation motorgear. Reactivation battery

SIEMENS	SIMATIC HMI
Run Time I Ohrs.	Motor Process: : 0seg.
Motor React operating Ohrs. Omir	time + Rotor: n. : Oseg.
BR c Ohrs. Omir	operating time: n. : Oseg.
	Various Tasks
F1 F2	F3 F4

![](_page_36_Picture_1.jpeg)

#### Alarms 9.

Alarm screen: When an alarm is triggered, the lower alarm button flashes yellow and the notification window opens automatically (from any menu)

Alarm window					<u>×</u>
Time	Date	Text			
10:04:55	3/15/2021	Some of t	he thermal prot	ections fired.	
10:04:55	3/15/2021	ST1 probe	damaged or p	oorly connecte	ed.
10:04:55	3/15/2021	Some Alar	m Activated		
-					
≣?					<b>I</b>
					>>

Once the fault is resolved, the alarm button stops flashing, but the information message stays on the alarm screen.

Pressing X closes the window and returns to the previous screen.

![](_page_37_Picture_1.jpeg)

**Warnings/Alarms:** The alarms menu shows the active alarms in the equipment at that moment.

The warning/alarms menu can be accessed at any time by pressing the alarms icon

or F1 (from any menu).

NOTICES / ALARMS         No.       Text       Time       Date         !       6       Some of the thermal protections fired.       9:5       3/15/         !       1       ST1 probe damaged or poorly connected.       9:5       3/15/         !       12       Some Alarm Activated       9:5       3/15/	S	IEN	MENS	SIMATIC HM
No.       Text       Time       Date         !       6       Some of the thermal protections fired.       9:5 3/15/         !       1       ST1 probe damaged or poorly connected.       9:5 3/15/         !       12       Some Alarm Activated       9:5 3/15/			NOTICES / ALARM	s
!       6       Some of the thermal protections fired.       9:5 3/15/         !       1       ST1 probe damaged or poorly connected.       9:5 3/15/         !       12       Some Alarm Activated       9:5 3/15/		No.	Text	Time Date
! 1       ST1 probe damaged or poorly connected.       9:5 3/15/         ! 12       Some Alarm Activated       9:5 3/15/  .	!	6	Some of the thermal protections fired.	9:5 3/15/
!     12     Some Alarm Activated     9:5 3/15/	!	1	ST1 probe damaged or poorly connected	. 9:5 3/15/
		?		— →
	1		† 📬 🗾	
		E	1 F2 F	3 F4

Once the fault is resolved, the alarm button stops flashing, but the information message stays on the alarm screen.

To remove the list of alarms from the alarms screen, press the lower right button for each alarm.

![](_page_37_Picture_8.jpeg)

![](_page_38_Picture_1.jpeg)

#### 10. PLC List of alerts

ID	Alarm	Component involved	Possible causes	Recommended actions
1	Probe ST1 damaged or incorrectly connected.	Temperature probe ST1 Temperature converter	F9 fuse blown; inverter damaged, incorrect configuration or connection of the inverter; damaged ST1 probe or incorrect connection	Check connections and if necessary replace components.
2	Clogged process air filter.	Process air filter pressure switch P1 (on request)	Clogged filter	Clean or replace filter.
3	High efficiency, dry air filter is blocked.	High efficiency, dry air filter pressure switch	Clogged filter	Clean or replace filter.
4	P4 type HEPA dry air filter pressure switch (on request). Clogged filter.	High efficiency, dry air filter pressure switch, HEPA type	Clogged filter	Clean or replace filter.
5	Reactivation air filter pressure switch P2 on request Clogged filter.	Reactivation air filter pressure switch P2 (on request)	Clogged filter	Clean or replace filter.
6	One of the thermal protective devices triggered.	Protections 10Q1,12Q1, 13Q1, 8FX	Thermal magneto trigger	Check currents absorbed by motors and resistances with the calibres of the protections
7	Rotation detector is damaged Damaged gear motor. Bad connection, fuses or damaged capacitor. Damaged or slipping tensioner belt.	Spin detector	Spin detector damaged; speed reducer motor damaged; bad connection or fuses/condensers blown; tightening belt broken or slipping.	Check that the rotor is turning, check the proximity of the rotor spin detector, check speed reducer motor fuses or condensers.
8	Damaged P0 safety pressure switch or reactivation air flow is not enough.	Safety pressure switch P0	Reactivation air flow is too low	Check air flow and components involved in the reactivation zone (fan, flaps, filters. etc.).

![](_page_39_Picture_1.jpeg)

ID	Alarm	Component	Possible causes	Recommended		
	Overtemperature in BRE.	Once the ST1 temperature limit of 145°C is exceeded for more than 6 seconds, the circuit breaker for the electric heater lines is triggered and the alarm will be activated (9).				
9		Solid state relay SSR operation protection.	Fault reported from the SSR electronic control. (See Datasheet according to reference). Cooling fins obstructed, or failure or obstruction of the heat sink motor.	Check SSR cooling or ventilation components. Check the condition of the reactivation electric heater components. Check the ventilation air flow.		
		Contacts or temperature probe ST1	Electro-mechanical fault of the contacts K1, K2, K3, or maximum reactivation temperature exceeded (145°C).	To deactivate the alarm press Check the operation of the contactors. Check the reactivation air flow		
		Safety thermostat TS open.	Excessive reactivation air temperature .	Correction: Reset mechanical thermostat (TS). Check the reactivation air flow		
10	TO BE ASSIGNED	-	-	-		
11	Problems with BR contactors	Fault in PLC outlets Q1 to Q4	Short-circuit or overload in a PLR Q outlet.	Check the components connected to the outlet or replace the unit.		
12	An alarm is triggered	Any component	All those present on this list	See solution corresponding to alarm triggered at that time.		
	10M1	Process fan (motor)	The useful life period has been reached	Check motor maintenance and reset counter.		
13						

![](_page_40_Picture_1.jpeg)

ID	Alarm	Component involved	Possible causes	Recommended actions
15	Reactivation motor requires maintenance	Reactivation or gear motor fan (motor)	The useful life period has been reached	Check motor maintenance and reset counter.
16	Reactivation coil requires maintenance	Reactivation battery	The useful life period has been reached	Check motor maintenance and reset counter.
17	To be assigned	-	-	-
18	To be assigned			
19	To be assigned			
20	To be assigned	-		
21	Process Fan Thermal Failure.	Process fan	The component thermal protection was tripped	Check the connection and status of the process motor and thermal protective device
22	To be assigned	-	-	-
23	Reactivation Fan Thermal Failure.	Reactivation fan	The component thermal protection was tripped	Check the connection and status of the process motor and thermal protective device
24	Gear motor Thermal Failure	Maintaining the desiccant rotor	The component's thermal protection has tripped (if incorporated in the equipment)	Check the connection and status of the gear motor and thermal protective device

![](_page_41_Picture_1.jpeg)

#### 11. Annex: Frequency inverter for the process fan motor

The process air fan motor has a frequency inverter to change its speed of rotation. Depending on the value of the flow or pressure chosen in the PLR menu, an analog signal will be sent from the PLR to the inverter, which will modulate the motor rotation frequency according to the fixed setpoint.

Some drive settings have been set for correct operation. If you want to change them manually, press the Loc / Rem button to switch to local control.

The tables of the different inverter parameters that have been modified for the different DFLEX models are attached below. Therefore, the value in the table may not match the actual value, which will appear on the inverter display.

![](_page_42_Picture_1.jpeg)

#### **DFLEX-1100 PARAMETERS**

Code	Page	Name	Unit	Setting range / Function		Factory setting	User setting
				0	[Factory parameter]		
				1	[Run permissive]		
я и ч	67	[Auto Set Function]	-	2	[3-wire]	0	0
				3	[+/- Speed]	_	
				4	[4-20mA ref. speed]		
A C C	97 97	[Accel. time 1]	s	-	0.0 - 3200	Depends on the model	60
d E C	96 168	[Decel. time 1]	s	-	0.0 - 3200	Depends on the model	60
F H	96 168	[Maximum frequency]	Hz	-	30.0-400.0	80.0	76
ШL	96 167	[Freq upper limit]	Hz	-	0.5- [Max.Freq.] ( <i>F H</i> )	50.0	73
L L	96 167	[Freq lower limit]	Hz	-	0.0 - [Freq upper limit] (UL)	0.0	0
υL	74 167	[Nominal freq, motor]	Hz	-	25.0 - 200.00	50.0	According to pate
	74 166	[Nominal voltage, motor]	V	230V models	50 - 330	230	According to plate
020				460V models	50 - 660	400	
EHr	74	[Thermal prot motor]	% / A	-	10-100% of nominal inverter output current	100%	According to inverter plate
FIII	104	[Selection LI F]	-	0-72	See table on page 200	2	2
F 130	124	[Function 1 RY Relay]	-	0-61. 254, 255	See table on page 200	4	14
F 132	125	[Function 1 FL Relay]	-	0-61, 254, 255	See table on page 200	11	22
F 146	119	[RY Delay]	s	-	0,0-60,0 s	0,0	1
FIYT	120	[FL Delay Relay]	s	-	0,0-60,0 s	0,0	3
F 2 0 0	123	[Auto/man ref speed]	-	0	[Enabled]	0	0
				1	[Disabled]		-
FZDY	121	[Point 2 freq VIA]	Hz		0,0 - 200,0	50.0	73
F 4 15	74	[I Nominal Motor]	А	-	0.1 - 200.0	Depends on the model	According to motor plate
FYIT	74	[Nom Motor Speed]	rpm	-	100- 15000	Depends on the model	According to motor plate
F60 /	73	[I Motor Limit]	%/A	-	10-110%	110%	According to motor plate

![](_page_43_Picture_1.jpeg)

#### **DFLEX-1300 PARAMETERS**

Code	Page	Name	Unit	Setting range / Function		Factory setting	User setting
				0	[Factory parameter]		
				1	[Run permissive]		
ЯЦЧ	67	[Auto Set Function]	-	2	[3-wire]	0	0
				3	[+/- Speed]		
				4	[4-20mA ref. speed]		
A C C	97 97	[Accel. time 1]	s	-	0.0 - 3200	Depends on the model	60
d E C	96 168	[Decel. time 1]	s	-	0.0 - 3200	Depends on the model	60
FH	96 168	[Maximum frequency]	Hz	-	30.0-400.0	80.0	76
ШL	96 167	[Freq upper limit]	Hz	-	0.5- [Max.Freq.] ( <i>F H</i> )	50.0	76
L L	96 167	[Freq lower limit]	Hz	-	0.0 - [Freq upper limit] ( <i>U L</i> )	0.0	0
υL	74 167	[Nominal freq, motor]	Hz	-	25.0 - 200.00	50.0	According to pate
	74 166	[Nominal voltage, motor]	V	230V models	50 - 330	230	According to plate
020				460V models	50 - 660	400	
EHr	74	[Thermal prot motor]	% / A	-	10-100% of nominal inverter output current	100%	According to inverter plate
FIII	104	[Selection LI F]	-	0-72	See table on page 200	2	2
F 130	124	[Function 1 RY Relay]	-	0-61. 254, 255	See table on page 200	4	14
F 132	125	[Function 1 FL Relay]	-	0-61, 254, 255	See table on page 200	11	22
F 146	119	[RY Delay]	s	-	0,0-60,0 s	0,0	1
F 147	120	[FL Delay Relay]	s	-	0,0-60,0 s	0,0	3
F 2 0 0	123	[Auto/man ref speed]	-	0	[Enabled]	0	0
FZDY	121	[Point 2 freq VIA]	Hz		0,0 - 200,0	50.0	76
F 4 15	74	[I Nominal Motor]	А	-	0.1 - 200.0	Depends on the model	According to motor plate
FYIT	74	[Nom Motor Speed]	rpm	-	100- 15000	Depends on the model	According to motor plate
F 6 0 I	73	[I Motor Limit]	%/A	-	10-110%	110%	According to motor plate

![](_page_44_Picture_1.jpeg)

#### **DFLEX-1700 PARAMETERS**

Code	Page	Name	Unit	Setting range / Function		Factory setting	User setting
				0	[Factory parameter]		
яцч				1	[Run permissive]		
	67	[Auto Set Function]	-	2	[3-wire]	0	0
				3	[+/- Speed]		
				4	[4-20mA ref. speed]		
A C C	97 97	[Accel. time 1]	s	-	0.0 - 3200	Depends on the model	60
d E C	96 168	[Decel. time 1]	s	-	0.0 - 3200	Depends on the model	60
FH	96 168	[Maximum frequency]	Hz	-	30.0-400.0	80.0	59
ШL	96 167	[Freq upper limit]	Hz	-	0.5- [Max.Freq.] ( <i>F H</i> )	50.0	54
L L	96 167	[Freq lower limit]	Hz	-	0.0 - [Freq upper limit] (UL)	0.0	0
υL	74 167	[Nominal freq, motor]	Hz	-	25.0 - 200.00	50.0	According to pate
	74 166	[Nominal voltage, motor]	v	230V models	50 - 330	230	According to plate
020				460V models	50 - 660	400	
EHr	74	[Thermal prot motor]	% / A	-	10-100% of nominal inverter output current	100%	According to inverter plate
FIII	104	[Selection LI F]	-	0-72	See table on page 200	2	2
F 130	124	[Function 1 RY Relay]	-	0-61. 254, 255	See table on page 200	4	14
F 132	125	[Function 1 FL Relay]	-	0-61, 254, 255	See table on page 200	11	22
F 146	119	[RY Delay]	s	-	0,0-60,0 s	0,0	1
F 147	120	[FL Delay Relay]	s	-	0,0-60,0 s	0,0	3
F 2 0 0	123	[Auto/man ref speed]	-	0	[Enabled] [Disabled]	0	0
FZDY	121	[Point 2 freq VIA]	Hz		0,0 - 200,0	50.0	54
F 4 15	74	[I Nominal Motor]	А	-	0.1 - 200.0	Depends on the model	According to motor plate
FYIT	74	[Nom Motor Speed]	rpm	-	100- 15000	Depends on the model	According to motor plate
F60 /	73	[I Motor Limit]	%/A	-	10-110%	110%	According to motor plate

![](_page_45_Picture_1.jpeg)

#### **DFLEX-2100 PARAMETERS**

Code	Page	Name	Unit	Setting range / Function		Factory setting	User setting
				0	[Factory parameter]		
яцч				1	[Run permissive]		
	67	[Auto Set Function]	-	2	[3-wire]	0	0
				3	[+/- Speed]		
				4	[4-20mA ref. speed]		
A C C	97 97	[Accel. time 1]	s	-	0.0 - 3200	Depends on the model	60
d E C	96 168	[Decel. time 1]	s	-	0.0 - 3200	Depends on the model	60
FH	96 168	[Maximum frequency]	Hz	-	30.0-400.0	80.0	59
ШL	96 167	[Freq upper limit]	Hz	-	0.5- [Max.Freq.] ( <i>F H</i> )	50.0	58
L L	96 167	[Freq lower limit]	Hz	-	0.0 - [Freq upper limit] (UL)	0.0	0
υL	74 167	[Nominal freq, motor]	Hz	-	25.0 - 200.00	50.0	According to pate
	74 166	[Nominal voltage, motor]	v	230V models	50 - 330	230	According to plate
020				460V models	50 - 660	400	
EHr	74	[Thermal prot motor]	% / A	-	10-100% of nominal inverter output current	100%	According to inverter plate
FIII	104	[Selection LI F]	-	0-72	See table on page 200	2	2
F 130	124	[Function 1 RY Relay]	-	0-61. 254, 255	See table on page 200	4	14
F 132	125	[Function 1 FL Relay]	-	0-61, 254, 255	See table on page 200	11	22
F 146	119	[RY Delay]	s	-	0,0-60,0 s	0,0	1
F 147	120	[FL Delay Relay]	s	-	0,0-60,0 s	0,0	3
F 2 0 0	123	[Auto/man ref speed]	-	0	[Enabled] [Disabled]	0	0
FZDY	121	[Point 2 freq VIA]	Hz		0,0 - 200,0	50.0	58
F 4 15	74	[I Nominal Motor]	А	-	0.1 - 200.0	Depends on the model	According to motor plate
FYIT	74	[Nom Motor Speed]	rpm	-	100- 15000	Depends on the model	According to motor plate
F60 /	73	[I Motor Limit]	%/A	-	10-110%	110%	According to motor plate

![](_page_46_Picture_1.jpeg)

#### **DFLEX-2900 PARAMETERS**

Code	Page	Name	Unit		Setting range / Function		User setting
				0	[Factory parameter]		
я и ч				1	[Run permissive]		
	67	[Auto Set Function]	-	2	[3-wire]	0	0
				3	[+/- Speed]		
				4	[4-20mA ref. speed]		
A C C	97 97	[Accel. time 1]	s	-	0.0 - 3200	Depends on the model	60
d E C	96 168	[Decel. time 1]	s	-	0.0 - 3200	Depends on the model	60
FH	96 168	[Maximum frequency]	Hz	-	30.0-400.0	80.0	51
ШL	96 167	[Freq upper limit]	Hz	-	0.5- [Max.Freq.] ( <i>F H</i> )	50.0	48
L L	96 167	[Freq lower limit]	Hz	-	0.0 - [Freq upper limit] ( <i>U L</i> )	0.0	0
υL	74 167	[Nominal freq, motor]	Hz	-	25.0 - 200.00	50.0	According to pate
	74 166	[Nominal voltage, motor]	v	230V models	50 - 330	230	According to plate
020				460V models	50 - 660	400	
EHr	74	[Thermal prot motor]	% / A	-	10-100% of nominal inverter output current	100%	According to inverter plate
FIII	104	[Selection LI F]	-	0-72	See table on page 200	2	2
F 130	124	[Function 1 RY Relay]	-	0-61. 254, 255	See table on page 200	4	14
F 132	125	[Function 1 FL Relay]	-	0-61, 254, 255	See table on page 200	11	22
F 146	119	[RY Delay]	s	-	0,0-60,0 s	0,0	1
F 147	120	[FL Delay Relay]	s	-	0,0-60,0 s	0,0	3
F 2 0 0	123	[Auto/man ref speed]	-	0	[Enabled] [Disabled]	0	0
FZDY	121	[Point 2 freq VIA]	Hz		0,0 - 200,0	50.0	48
F 4 15	74	[I Nominal Motor]	A	-	0.1 - 200.0	Depends on the model	According to motor plate
FHIT	74	[Nom Motor Speed]	rpm	-	100- 15000	Depends on the model	According to motor plate
F 6 0 1	73	[I Motor Limit]	%/A	-	10-110%	110%	According to motor plate

![](_page_47_Picture_1.jpeg)

#### **DFLEX-3500 PARAMETERS**

Code	Page	Name	Unit		Setting range / Function	Factory setting	User setting
				0	[Factory parameter]		
яцч				1	[Run permissive]		
	67	[Auto Set Function]	-	2	[3-wire]	0	0
				3	[+/- Speed]		
				4	[4-20mA ref. speed]		
A C C	97 97	[Accel. time 1]	s	-	0.0 - 3200	Depends on the model	60
d E C	96 168	[Decel. time 1]	s	-	0.0 - 3200	Depends on the model	60
F H	96 168	[Maximum frequency]	Hz	-	30.0-400.0	80.0	51
ШL	96 167	[Freq upper limit]	Hz	-	0.5- [Max.Freq.] ( <i>F H</i> )	50.0	50
L L	96 167	[Freq lower limit]	Hz	-	0.0 - [Freq upper limit] (UL)	0.0	0
υL	74 167	[Nominal freq, motor]	Hz	-	25.0 - 200.00	50.0	According to pate
	74 166	[Nominal voltage, motor]	v	230V models	50 - 330	230	According to plate
020				460V models	50 - 660	400	
EHr	74	[Thermal prot motor]	% / A	-	10-100% of nominal inverter output current	100%	According to inverter plate
FIII	104	[Selection LI F]	-	0-72	See table on page 200	2	2
F 130	124	[Function 1 RY Relay]	-	0-61. 254, 255	See table on page 200	4	14
F 132	125	[Function 1 FL Relay]	-	0-61, 254, 255	See table on page 200	11	22
F 146	119	[RY Delay]	s	-	0,0-60,0 s	0,0	1
FIYT	120	[FL Delay Relay]	s	-	0,0-60,0 s	0,0	3
F 2 0 0	123	[Auto/man ref speed]	_	0	[Enabled]	0	0
		1 · · · · · · · · · · · · · · · · · · ·		1	[Disabled]		
FZDY	121	[Point 2 freq VIA]	Hz		0,0 - 200,0	50.0	50
F 4 15	74	[I Nominal Motor]	А	-	0.1 - 200.0	Depends on the model	According to motor plate
FYIT	74	[Nom Motor Speed]	rpm	-	100- 15000	Depends on the model	According to motor plate
F60 /	73	[I Motor Limit]	%/A	-	10-110%	110%	According to motor plate

![](_page_48_Picture_1.jpeg)

#### DFLEX 2900-3500(PF) PARAMETERS

Code	Page	Name	Unit		Setting range / Function	Factory setting	User setting
				0	[Factory parameter]		
				1	[Run permissive]		
<i>АЦЧ</i>	67	[Auto Set Function]	-	2	[3-wire]	0	0
				3	[+/- Speed]		
				4	[4-20mA ref. speed]		
A C C	97 97	[Accel. time 1]	s	-	0.0 - 3200	Depends on the model	60
d E C	96 168	[Decel. time 1]	s	-	0.0 - 3200	Depends on the model	60
F H	96 168	[Maximum frequency]	Hz	-	30.0-400.0	80.0	50
ШL	96 167	[Freq upper limit]	Hz	-	0.5- [Max.Freq.]	50.0	48
L L	96 167	[Freq lower limit]	Hz	-	0.0 - [Freq upper limit]	0.0	0
υL	74 167	[Nominal freq, motor]	Hz	-	25.0 - 200.00	50.0	According to pate
	74 166	[Nominal voltage, motor]	V	230V models	50 - 330	230	According to plate
020				460V models	50 - 660	400	
EHr	74	[Thermal prot motor]	% / A	-	10-100% of nominal inverter output current	100%	According to inverter plate
FIII	104	[Selection LI F]	-	0-72	See table on page 200	2	2
F 130	124	[Function 1 RY Relay]	-	0-61. 254, 255	See table on page 200	4	14
F 132	125	[Function 1 FL Relay]	-	0-61, 254, 255	See table on page 200	11	22
F 146	119	[RY Delay]	s	-	0,0-60,0 s	0,0	1
F 147	120	[FL Delay Relay]	s	-	0,0-60,0 s	0,0	3
F 2 0 0	123	[Auto/man ref speed]	-	0	[Enabled]	0	0
6.2.0.1				1			
FZUY	121	[Point 2 freq VIA]	Hz		0,0 - 200,0	50.0	48
F 4 15	74	[I Nominal Motor]	A	-	0.1 - 200.0	Depends on the model	According to motor plate
FHIT	74	[Nom Motor Speed]	rpm	-	100- 15000	Depends on the model	According to motor plate
F60 /	73	[I Motor Limit]	%/A	-	10-110%	110%	According to motor plate