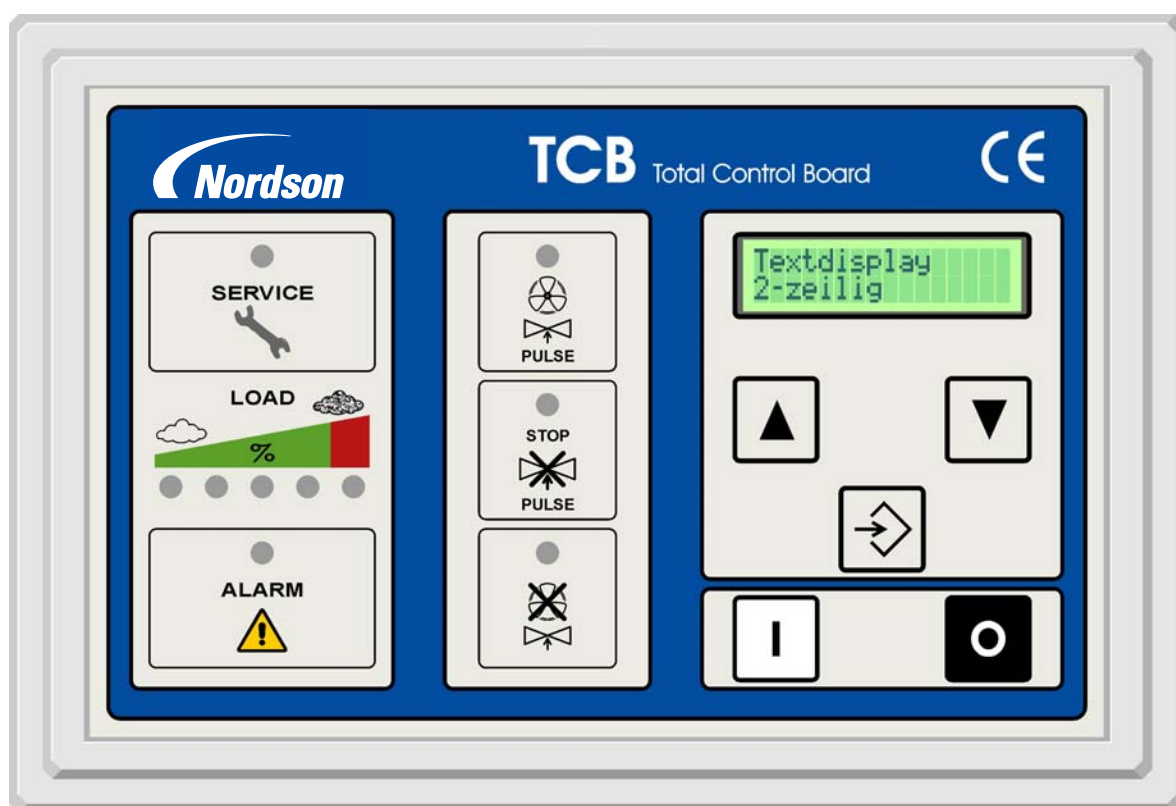


# Total Control Board

(From October 2007)



## IMPORTANT

**PLEASE READ THIS MANUAL CAREFULLY BEFORE INSTALLATION**

**THIS MANUAL SHOULD BE READ IN CONJUNCTION WITH THE RESPECTIVE  
PRODUCT MANUAL AND CIRCUIT DRAWINGS SUPPLIED WITH THE  
AFTERFILTER**

## EXPLANATION OF SYMBOLS USED



Refers to special information regarding the most efficient use.



Refers to special information directed towards preventing damage.



Refers to special information designed to prevent injury or extensive damage.

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## 1. INTRODUCTION



*It is a requirement of the Supply of Machinery (Safety) Regulations 1992 to provide adequate isolation and emergency stop facilities. Due to the varied nature of site installations this cannot be provided by Nordson but instead is the responsibility of the customer.*



*For installation in hazardous areas, all work must be carried out with the electrical supply isolated or only when the potentially explosive atmosphere is not present. Checks should be made to ensure the category of equipment is suitable for the zone in which the installation is made.*



*All electrical work has to be done by a qualified electrician according to the national and local electric codes that apply. (EN60204.1, IEC 364).*



*All electrical power must be shut off during installation of the Control Board.*



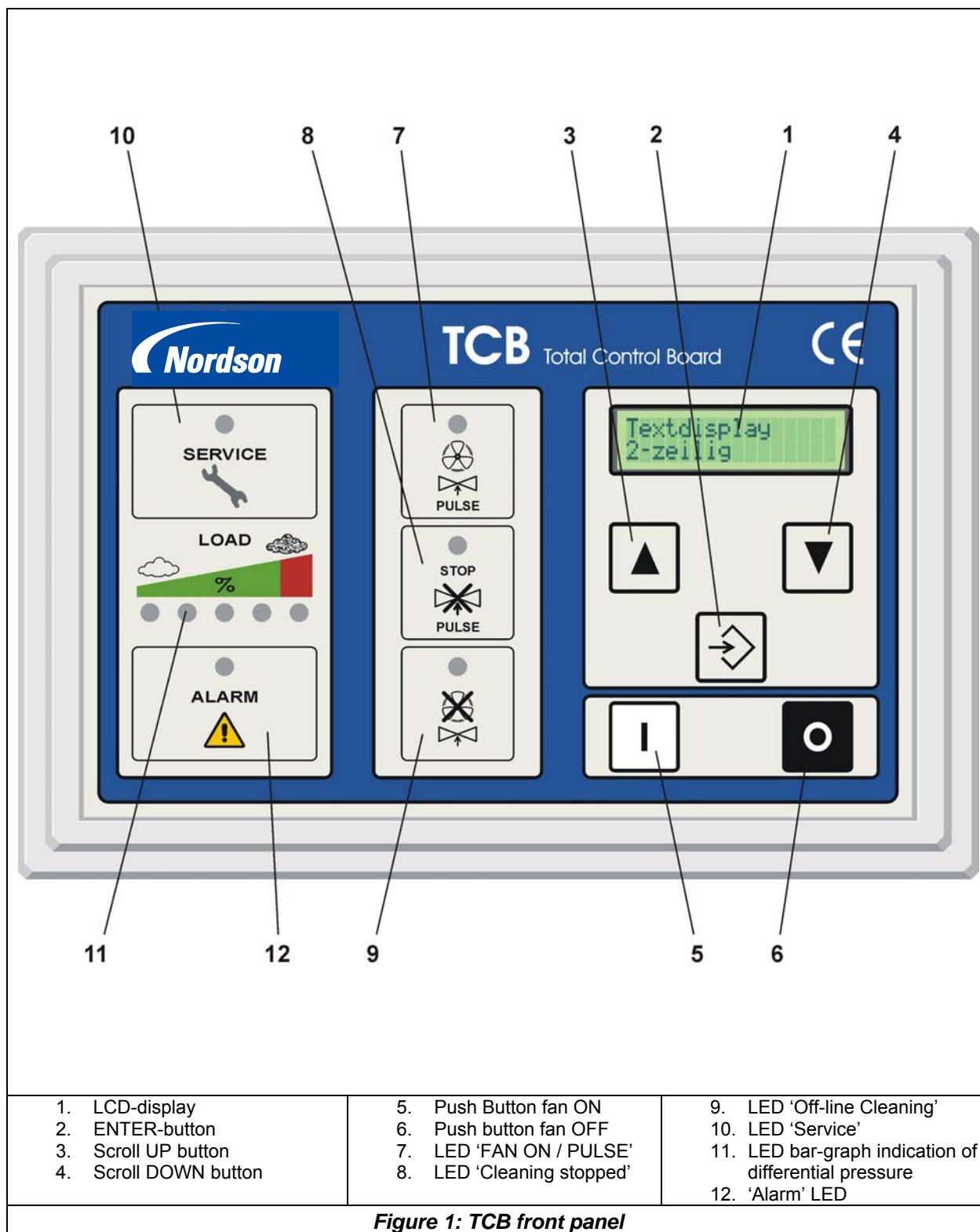
*Do not apply power on any circuits before all connections have been made.*



*On outside installations, always isolate power before opening the controller in wet weather conditions.*

The Control Board provides following functions:

- Starting and stopping of the cleaning function at the assigned (adjustable) set points, initiating the individual pulses in an appropriate sequence, providing the correct time interval between pulses, energizing the solenoid valve for the proper length of time, and also providing the logic to control the alternate cleaning modes
- Connection of up to 32 valves in parallel mode. (16 valves for the light version - based on 22w / Valve).
- Connection of up to 96 valves in a serial linked, multi module system. (based on 22w / Valve).
- Operation of multiple fan systems (e.g. ECB units) under either standard or 'ATEX' mode cleaning.
- An LCD-display showing all settings and alarm messages
- Push buttons to start and stop the fan
- Overload protection of the fan(s).
- A visual display of the pulse cleaning
- A bar graph indicating the differential pressure over the filter elements
- Possibility to set an adjustable off-line cleaning cycle
- A visual display of the off-line cleaning cycle when set
- 'Stop-and-go' or 'stop-and-end' setting (explanation: see chapter 7.11)
- Programmable input and output functions
- Optional remote control installation
- Optional alarm installation



## 2. DELIVERY AND MOUNTING INSTRUCTIONS

The TCB is normally delivered pre-mounted and pre-wired with the Afterfilter. In case the TCB is shipped loose with the unit, follow the next steps to ensure a faultless functioning of the control box.



*When the Control Board is received, verify that the enclosure has not been damaged during shipment. Compare the items received against the packing list. If you find any components that are damaged or missing, notify the delivery company and your local Nordson representative.*

Unpack the Control Board enclosure. Some items may have been shipped inside the enclosure. Remove any packing material and dispose of it properly.

Items shipped loose with the Control Board may include:

- Slave Solenoid valve enclosures
- safety filter
- wiring diagram
- installation and operation manual
- spare fuses

### 2.1. Enclosure location

---

The enclosure of the Control Board should be mounted in a location convenient for the operator or maintenance personnel. Since the display provides visual warning of problems and operating conditions, much of its value is lost if the location does not permit continuous observation. For the longest, most trouble-free operation, mount the enclosure on the unit or a wall/column with little or no vibration.

The distance away from the Afterfilter is limited by the length of tubing and cable supplied with the equipment (standard 10 m).

In order to get reliable signals to the sensors, the Control Board's pneumatic sensor lines should not exceed 20 m. Lengths in excess of this may weaken the signals to the point that they are not reliable. Contact your Nordson representative for assistance if the sensor lines must be longer than 20 m.

If the area in which the controller is to be located is defined as a hazardous area check to ensure the rating of the controller supplied is suitable for this area.

### 2.2. Pneumatic installation

---

The Afterfilter has tubing fittings installed in the clean air plenum and the dirty air plenum. Attach one tube from the clean air plenum to the low pressure fitting on the enclosure (blue connector). Attach the other tube from the dirty air plenum to the high-pressure fitting (black connector). All connections need to be airtight.



*To avoid ingress of powder into the controller pressure transducer, it is recommended that an in-line filter is fitted between the dirty side of the collector and the controller connection. For collectors handling explosive powders this filter must be used in both the clean and dirty side connections.*

### 3. ELECTRICAL INSTALLATION



*For the connections to the control box see the wiring diagram shipped inside the enclosure.*



- *All electrical work must be done by a qualified electrician according to the national and local codes that apply.*
- *Do not attempt to wire any electrical components while energized. Electrocution and/or damage to the components may occur.*



- *Connect power supply to the main switch.*
- *When the control board is not factory pre-wired to the Afterfilter make the other connections to the terminals as per table on page 13.*

#### 3.1. Main switch IP65

The incoming power is connected to the terminals on the main switch inside the enclosure. On standard power boxes the main switch will be mounted on the door. The enclosure cannot be opened without first turning off the power to the box (main switch in position '0').

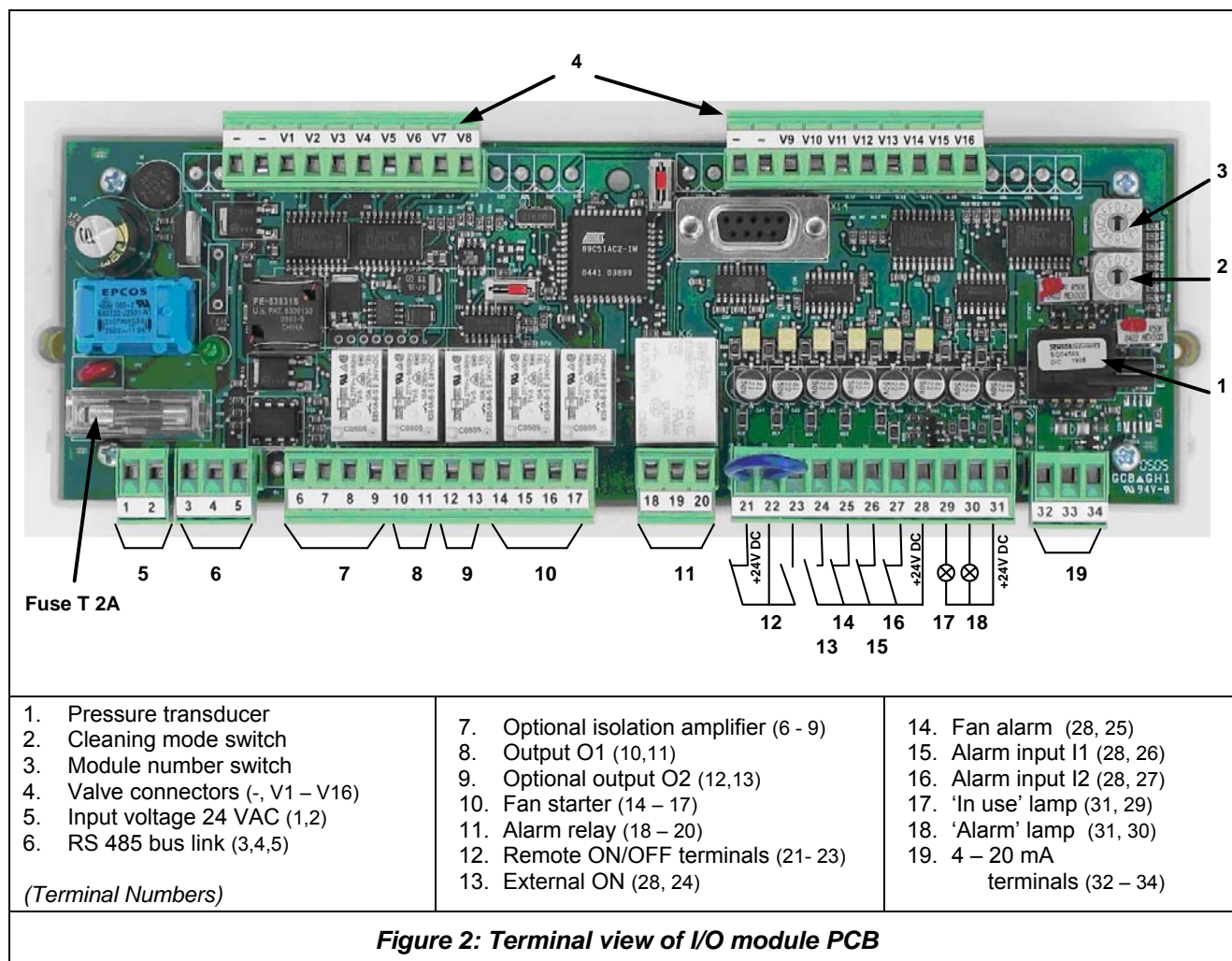
A neutral terminal is provided for termination of a neutral conductor. The neutral connection is not however required for operation of the controller.

#### 3.2. Motor connection

For pre-wired units the motor connections will be made directly to the contactors of the fan according the wiring diagram delivered inside the TCB enclosure.

For controllers shipped loose connections should be made to the DIN rail terminals according to the wiring diagrams delivered inside the TCB.





### 3.3. Supply voltage: terminals 1 and 2

The supply voltage for the power box can be either 200V AC, 230V, 380V, 400V (standard TCB), 440V or 480V, 50 or 60 Hz. A transformer with 63VA or 110VA output will be used. The electronic modules will be supplied with pre-wired 24V AC on terminals 1 and 2.

### 3.4. RS-485 Bus: terminal 3-5

All TCB Circuit boards have an RS-485 interface for the communication between Display, I/O module and slave valve modules. For multiple module systems the RS485 connection is pre-wired to socket connections on the base of the main controller and the ends of the slave modules.

### 3.5. Motor protection: terminals 25, 28

An overload relay is used for the fan motor(s); the auxiliary contact will be connected to terminals 25 and 28 (multiple fan overloads will be connected in series). When the fan alarm triggers a shutdown of the fan set, a re-start is only possible after shutting down the power to the control box and re-setting the overload switch.

### 3.6. Optional isolation amplifier for thermistor protection and/or bursting disc: terminals 6–9

An optional isolation amplifier for motor thermistor protection or bursting disk observer circuit can be plugged into the I/O module PCB. The input connections will be made to terminal 6 and 7; at terminal 8 and 9 a potential free contact (NC) is available as output signal. This output signal can then be used for example to initiate an alarm in the TCB by connecting it to terminals 26 and 28.

The terminals for the thermistor will be included as standard on the TCB board, but the Thermistor module itself is an option.

### 3.7. Connections for Fan starters : terminals 14–17 (+ 12 & 13 for ECB 4 units)

The contactors for fan starting will be connected as follows:

Terminal 14 = Common = 24V AC Supply.

Terminal 15 = Main contactor for Star-Delta systems, Fan 1 contactor for DOL / multiple fan systems.

Terminal 16 = Star contactor for Star-Delta systems, Fan 2 contactor for multiple fan system

Terminal 17 = Delta contactor for Star-Delta systems, Fan 3 contactor for multiple fan system.

For a 4 fan system :

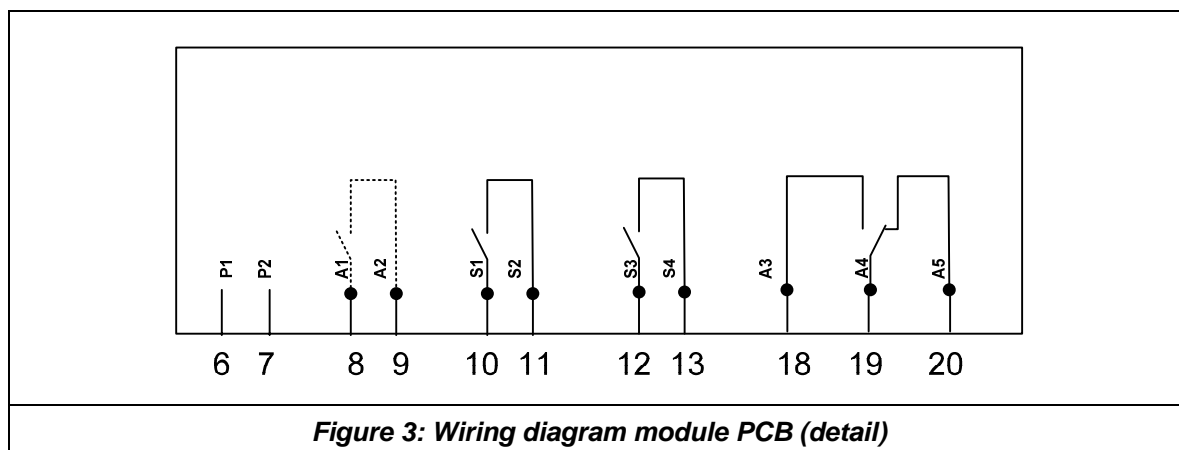
Terminal 12 = Common = 24V AC Supply.

Terminal 13 = Fan 4 contactor.

These connections are made at the factory.

### 3.8. Alarm relay: terminals 18–20

A change over contact is available on terminals 18-20. The relay is normally energised and is de-energised when an alarm condition occurs (red alarm lamp on the display lights up) or when a power failure occurs (see Figure 3 schematic below).



### 3.9. Remote start/stop push buttons: terminals 21–23

The external ON/OFF push button circuit can be connected to terminals 21-23. The terminals 21 and 22 are connected ex works. To start the fan set: momentarily close contact 23 and 22 (Normally open contact). To stop the fan set: momentarily open contact 21 and 22 (normally closed contact).

### 3.10. Input external on: terminal 24, 28

The input terminal 24 can be used to start the filter from an external potential free contact. Closing the contact = fan start, cleaning operational; opening the contact = fan off. In this case terminals 21 and 22 (remote stop) are bridged.



Note all stop / start signals have equal priority and the system can be stopped and started using the display or remote stop buttons even if terminals 24 and 28 are bridged. To restart from terminals 24 and 28 this connection must be opened and re-closed. The fan will not start when the main power is turned on even if 24 & 28 are bridged.

### **3.11. Outputs for remote control lamps: terminals 29–31**

Outputs for 'Alarm' and 'Fan on'-lamps; 24 V maximum load 2W.

### **3.12. Optional analogue output: terminals 32–34**

When this option is supplied a sensor with accuracy of 2,5% will be used. The analogue output is available at terminals 32-34. The usage of the 0.5% accuracy sensor is possible (at an additional cost). Optionally the terminals 32-34 can be used as analogue 4-20 mA input (ATEX zone 1 or 2 applications using external pressure transducer). Terminal 32 = Ground; 33 = in - or output signal sensor; 34 = Common (+).

### **3.13. Valve outputs: terminals V1–V16 – Single module systems**

The (-) connection of the valves will be made to terminals V1 to V16. The outputs have a maximum load of 1.9A (45W at 24V DC). The outputs are short circuit and over voltage protected. Up to two solenoid valves (22W) per output terminal can be connected, so 32 valves in total.

### **3.14. Valve outputs: terminals V1–V16 – Multiple module systems**

Where the TCB is used to operate more than 32 valves a serial linked system is used. The master TCB will contain an I/O module for connection of motor contactors, alarms, input and output signals. Valves will be connected using 3 or more slave modules connected to the system using the RS-485 bus connection. Each slave module contains an PCB pre-wired to the solenoids – max 16 / module. The slave modules should be connected together and to the master TCB using the connecting leads supplied.

### **3.15. Rotary switches “Slave address” and “mode”.**

The two rotary switches “slave address” and “mode” are used to set the module number and cleaning mode. The setting of switches is for the master and pre-mounted slave modules are done in the factory and should not be changed. For modules assembled to the collector on site set the slave address switches as detailed below.

Settings are as follows:

- Master system – Slave Address = 0,  
Mode = 0
- Slave modules – Slave address = 1, 2, 3, .... Etc – 1 = Nearest to the master controller.  
Mode = 0

### 3.16. Programmable inputs

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Two additional alarms / inputs can be connected to the terminals 26, 27 and 28. The function of these alarm inputs can be selected by the software (see chapter 7.11).

Input I1 = terminals 26-28, Input I2 = terminals 27-28. Terminals bridged = no alarm / input, opening connection = alarm / input active.

### 3.17. Programmable outputs

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Two programmable outputs (volt free contacts) are available on terminals 10,11 & 12,13  
The function of these outputs can be selected by the software (see chapter 7.13).

Default settings are :

- Output 1 – contact closed when cleaning is active. (Setting = 01 - Cleaning on)
- Output 2 – contact closed during fan operation and off-line cleaning. (Setting = 03 - Fan on +)



Note : The programmable outputs 1 and 2 are not available in multi fan ECB systems as the relays are used to connect fan contactors in these configurations.

	Terminal	Item	Description	Remarks
<b>Bus Connection</b>	3,4,5	RS 485 Bus connection	Serial link connection between display and I/O modules	
<b>Outputs</b>	8, 9	Thermistor / bursting disc	Relay output signal for Thermistor circuit or bursting disc Reed-contact.	Max. contact load of relays: 5 A - 230 VAC / 2 A - 24 VDC
	10, 11	Programmable output O1	The contact closes during cleaning as default setting. (Used for fan 4 in multi-fan ECB configurations)	Max. contact load of relays: 5 A - 230 VAC / 2 A - 24 VDC
	12, 13	Optional programmable output O2	The contact closes during fan operation and off-line cleaning as default setting. (Used for lighting circuit in multi-fan ECB configurations)	Max. contact load of relays: 5 A - 230 VAC / 2 A - 24 VDC
	18, 19, 20	General alarm	19 Common, 18 Normally Open, 20 Normally Closed.	Max. contact load of relays: 5 A - 230 VAC / 2 A - 24 VDC
	29, 31	'Fan on' lamp	Output for external control lamp "fan set operational"	24VDC, Max load 2W
	30, 31	Alarm lamp	Output for external control lamp "Alarm"	24VDC, Max load 2W
	32, 33, 34	4-20 mA output signal	Analogue output for differential pressure (4 mA = 0 daPa, 20 mA = 500 daPa).	4 – 20 mA Recommended external resistance 150-250 Ω
<b>Inputs</b>	1, 2	Supply voltage	24 V AC Supply voltage for PCB	
	6, 7	Thermistor / bursting disc	Optional input for Thermistor circuit or Bursting disc reed contact.	Use a potential free NC contact
	22, 23	Input remote switch 'ON'	Input to connect a remote switch (in parallel): ON (terminal 22 holds + 24 VDC)	Use a potential free NO contact
	21, 22	Input remote switch 'OFF'	Input to connect a remote switch (in parallel): OFF (terminal 22 holds + 24 VDC)	Use a potential free NC contact (Supplied bridged ex-works)
	24, 28	Input external 'ON'	Input to connect an external contact for fan operation (terminal 28 holds +24 VDC)	Use a potential-free NO contact
	25, 28	Fan alarm input terminal	Overload relay for fan motor (terminal 28 holds + 24 VDC).	Use a potential free NC contact
	26, 28	Programmable alarm input I1	When contact opens an alarm message is displayed as default setting.	Use a potential free NC contact
	27, 28	Programmable alarm input I2	When contact opens an alarm message is displayed as default setting.	Use a potential free NC contact
	32, 33, 34	4-20 mA input signal	Analogue 4-20 mA input signal. 32 Ground, 33 in- or output, 34 common. (ATEX zone 1 and 2 applications)	4 –20 mA
<b>Valves</b>	V1 to V16	Valve connection - (minus)	Output for the (-) connection of the valves	See notes below.
	+	Valve connection + (plus)	Output for the common (+) connection of the valves.	
<b>Fan</b>	14, 15, 16, 17	Contactor fan motor(s)	Terminal 14: Common connection Terminal 15: Mains contactor (ECB Fan 1) Terminal 16: Star contactor (ECB Fan 2) Terminal 17: Delta contactor (ECB Fan 3)	Max. contact load of relays: 5 A - 230 VAC / 2 A - 24 VDC



*Terminals 8 to 20 are connected with potential-free contacts relays.*

*All valve connections made with the I/O module PCBs must be in numerical sequence without gaps.*

*I/O module PCBs have only RS485 bus and valve connection terminals.*



- *Relays used for solenoid control have a maximum loadings as follows:*
- *1.9A (45W at 24V DC) for master I/O module – suitable for connection of 2 valves of 22W in parallel.*
- *1.0A (25W at 24V DC) for slave I/O modules – 1 pre-connected valves of 22W only.*
- *Only one valve per compressed air manifold can be operated at the same time.*

## 4. PRE-START-UP CHECKLIST

- Make sure all connections to both air and electrical supplies are in the correct position (when not pre-mounted).
- Recheck all the electrical and air connections for tightness.
- Verify that all electrical systems have been properly grounded.
- Verify if the motor protection switch setting matches the motor full load current.
- Check the star/delta change over delay setting. Factory default is at 5 seconds, but it can be adjusted in the setting mode (see chapter 7.7).
- For a multi-module system ensure all interconnecting cables are in place and mode and address switches are set correctly.



*After the electrical connections are in place ensure that the door is correctly closed and secured. The enclosure is designed so the main switch needs to be turned off before the front panel can be opened.*

## 5. OPERATION

### 5.1. Single Fan Afterfilter Systems

The TCB control board provides the output signals to the diaphragm valves mounted on the Afterfilter and also controls the fan motor start-up procedure (and can controls other auxiliary equipment if fitted – e.g. rotary valve, screw conveyor etc). The differential pressure measured gives a clear indication of the pressure loss over the filter elements.

By default the unit will start pulsing when the threshold value of 80 daPa is exceeded. A cleaning cycle normally pulses all valves of the unit in sequence with an interval of 10 seconds between every pulse. As soon as the differential pressure drops below 40 daPa, the controller will stop the cleaning when a full cycle is completed; this is called 'Stop & End' cleaning.

The LCD display will indicate the status of the unit during operation e.g. SYSTEM ON, CLEANING ON etc. as well as indicating the current filter differential pressure.

When the differential pressure rises above 150 daPa, an alarm message will be displayed and the alarm LED will illuminate.

The off-line clean function allows the cleaning cycle to continue for a number of cycles after the fan has been switched off. This function is switched off by default but can be initiated by altering parameter P06.

These factory default values can be altered when needed using the guidelines detailed in the following chapters.

### 5.2. Multiple Fan Units e.g. ECB Units

The TCB control board provides the output signals to the diaphragm valves mounted inside the Afterfilter and also controls the fan motor start-up sequence. The differential pressure measured gives a clear indication of the pressure loss over the filter elements.

For standard units handling non-explosive powders the cleaning will, by default, start pulsing when the threshold value of 80 daPa is exceeded. A cleaning cycle normally pulses all valves of the unit in sequence with an interval of 10 seconds between every pulse. As soon as the differential pressure



drops below 40 daPa, the controller will stop the cleaning when a full cycle is completed; this is called 'Stop & End' cleaning.

If off-line cleaning is to be carried out this is done one module at a time, the fans of the other modules maintaining suction in their respective unit sections to avoid powder clouds being generated outside the unit.

The number of cleaning cycles carried out depends on the pressure drop at the time the unit is stopped, the number of cycles set and also the pressure drop across the filters during the cleaning cycle. This sequence is designed to optimise the cleaning effectiveness while minimising air usage and cleaning time. During off-line cleaning the display will indicate the module being cleaned and the number of cycles remaining.

For ECB units handling explosive powders, and hence operating in a hazardous area the cleaning sequence is carried out only when the unit is off-line using the sequence described above. Cleaning on line is not initiated, regardless of filter differential pressure, to avoid generating a potentially hazardous atmosphere within the collector during periods where the working area outside the unit could potentially generate ignition sources.

The contactor provided to activate working area lighting is de-energised during off-line cleaning periods.

The software parameters controlling these cleaning sequences are factory set to correspond to the unit type supplied and installation conditions and cannot be changed.

## 5.3. Status LED's


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The status LEDs on the front display panel of the TCB have the following meanings:

- **SERVICE LED** - When during normal operation the service LED lights up, the unit needs to be checked by a Nordson representative.
- **LED BAR GRAPH** - The LED Bar graph will indicate the actual status of the filter
- **ALARM LED** - The Alarm LED will light up when one of the followings alarms occur:
  - Fan overload protection tripped
  - One or both additional alarm inputs at the module are "low"
  - DeltaP Alarm
- **FAN / PULSE LED** - The Pulse LED will flash when a pulse is active. When the Fan set is running, this LED will be on. When in the mean time the valves are pulsing, this LED will go out briefly on every active pulse. When the fan is not running, the LED will be out and flash when a pulse is active.
- **PULSE STOP LED** - The pulse stop LED will light up when cleaning is not active.
- **OFF LINE CLEANING LED** - The Off-line Cleaning LED will light up during off-line cleaning.

## 6. USING THE MENU SYSTEM

The 3 keys of the control keypad (▲, ▼, and ENTER) are used to navigate through the menu system of the Total Control board filter control system. All inputs and messages can be shown on a backlit LCD display. The menu system is deactivated during normal operation of the system. The actual values achieved by the system and its operating messages are displayed. This is called the “Display mode”. Changing of the current settings is done in the “setting mode”.

Button	Function
▼	GO DOWN in the menu system
▲	GO UP in the menu system
	ENTER the menu system or execute a function.

### 6.1. Display mode

During normal operation the LCD display on the TCB indicates the current differential pressure over the filter elements. In the display mode it is possible to view all settings without the possibility to change them. Press ENTER once and scroll up and down the menu using the ▼ and ▲ buttons. Following fields can be displayed:

Level	Display	Description
1.1	EXIT MENU SYSTEM	Press ENTER to leave the menu system
1.2	DP MIN P02      xxx daPa	Show DeltaP Min value
1.3	DP MAX P03      xxx daPa	Show DeltaP Max value
1.4	DP MAX ALARM P04      xxx daPa	Show DeltaP Max Alarm value
1.5	LOW PRESS ALARM P05      xxx daPa	Show the Low pressure alarm value
1.6	OFF LINE CLEAN C P06      xx CYCLES	Show number of Offline Cleaning Cycles
1.7	PULSE INTERVAL 1 P09      xxx SEC	Show Pulse Interval
1.8	TEST CONTROLLER P48              END	After pressing ENTER all LED's on the control panel light up for 10 sec.
1.9	TOTAL OPERAT H M05 xxxxxx HOURS	Show total number of operating hours
1.10	SETTING MODE PIN P00              xxxx	Enter PIN code to go to the Setting Mode

### 6.2. Setting mode

Press ENTER to activate the menu system. You are now in “Display Mode”. By pressing the ▼ button you will see the field “P00: Setting mode PIN”. The system will ask you for the pin code of the Setting mode when pressing the enter button. Put in the 4 digits one by one with the buttons ▼ and ▲ to increase or decrease the value and ENTER to go to the next digit and confirm. The default pin code is 9999. As soon as you enter the setting mode the yellow Service LED will start to blink.



You can now scroll through all parameters in the setting mode. To change a parameter push the ENTER button and the value can be changed. The new value needs to be confirmed by pushing the ENTER button again for 2 seconds otherwise the changed value will not be saved, but instead the message “Program cancelled” will be displayed. The values can only be changed within the range shown in the last column. The value between brackets is the factory setting. Following fields can be displayed:

Level	Display	Description	Setting range
2.1	EXIT MENU SYSTEM	Press ENTER to leave the menu system	
2.2	DP MIN P02      xxx daPa	Setting of DeltaP Min value	10 – 190 daPa (40)
2.3	DP MAX P03      xxx daPa	Setting of DeltaP Max value	30 – 340 daPa (80)
2.4	DP MAX ALARM P04      xxx daPa	Setting of DeltaP Max Alarm value	20 – 350 daPa (150)
2.5	LOW PRESS ALARM P05      xxx daPa	Setting of Low pressure alarm value	0 – 200 daPa (0 = Alarm off)
2.6	OFF LINE CLEAN C P06      xx CYCLES	Setting of Offline Cleaning Cycles	0 – 15 cycles (0)
2.7	ST TR SW TIME P07      xxx SEC	Setting of Star/Triangle switch time	1 – 60 s (5)
2.8	PULSE INTERVAL 1 P09      xxx SEC	Setting of Pulse Interval	2 – 30 s (10)
2.9	CLEAN PULSE TIME P12      xxx MS	Setting of valve Pulse time	40 – 235 ms (100)
2.10	DISPLAY LANG P15      ENGLISH	Setting the Display Language	See chapter 7.10 for different options
2.11	INPUT FUNCT I1 P17 0 (actual Mode)	Setting the alarm function of input I1.	See chapter 7.11 for different options
2.12	INPUT FUNCT I2 P18 0 (actual Mode)	Setting the alarm function of input I2.	See chapter 7.12 for different options
2.13	OUTPUT FUNCT O1 P19 0 (actual Mode)	Setting of function for output O1	See chapter 7.13 for different options
2.14	OUTPUT FUNCT O2 P20 0 (actual Mode)	Setting of function for output O2	See chapter 7.14 for different options
2.15	DP CLEAN MODE P22_ (actual Mode)	Setting of the Delta P Cleaning Mode	See chapter 7.15 for different options
2.16	NUMBER VALVES P26      xxx VALVES	Shows the number of valves	No setting possible
2.17	T/D DISPLAY P40 (Actual Mode)	Setting of summer and winter time or automatic switch between summer and winter	See chapter 7.17 for different options
2.18	DATE P41      DD.MM.20YY	Setting of date (day / month / year)	
2.19	TIME P41      hh:mm	Setting of time	

2.19	PROGRAM VERSION P44 VXX.XX.XX/X	Shows the version of the program	No setting possible
2.20	ACTIVE PULSE P46 VALVE XX YY	Shows the valve that is being pulsed. XX: Number of module YY: Number of valve	No setting possible
2.21	TEST CONTROLLER P48 END	After pressing ENTER all LED's on the control panel light up for 10 sec	
2.22	TOTAL OPERAT H M05 XXXXXX HOURS	Shows the total number of operating hours	No setting possible
2.23	FACTORY SETTINGS P50	Resetting all values to factory settings	
2.24	SETTING MODE PIN P00 XXXX	Setting a new PIN code by the customer	4-digit code (9999)

## 7. PARAMETER/MEMORY FIELDS DESCRIPTION

### 7.1. P00 Setting Pin code

The setting mode access pin code can be changed in the setting mode. The setting mode can only be entered by first entering the current PIN code. (Factory default PIN code = 9999)

### 7.2. P02 Delta P Min

DP\_MIN\_\_\_\_\_  
PO2\_\_\_\_XXX\_daPa

Once the cleaning has started, if the differential pressure drops below the value **DP Min** for at least 10 seconds, the cleaning stops.

### 7.3. P03 Delta P Max

DP\_MAX\_\_\_\_\_  
PO3\_\_\_\_XXX\_daPa

When the fan set is switched on, and the differential pressure increases to above the **DP Max** value for at least 10 seconds, the cleaning sequence is started.

### 7.4. P04 Delta P Max Alarm

DP\_MAX\_ALARM\_\_\_\_\_  
PO4\_\_\_\_XXX\_daPa

When the fan set is switched on, and the differential pressure rises above the **DP Max Alarm** value for at least 10 seconds, the DP Max Alarm is displayed. The alarm can be switched off after pushing the ENTER button when the differential pressure drops to a value at least 10% less than Delta P max. You can switch off the Delta P max alarm function by setting its value to "0".

### 7.5. P05 Low Pressure Alarm

LOW\_PRESS\_ALARM\_\_\_\_\_  
PO5\_\_\_\_XXX\_daPa

If one minute after the fan set is switched on, the differential pressure is less than the value of the **Low Pressure Alarm** for at least 10 seconds, a Low Pressure alarm is displayed. This alarm can be switched off after pushing the ENTER button when the differential pressure has risen above the Low pressure alarm. You can switch off the Low pressure alarm function by setting its value to "0".

#### 7.6. P06 Off Line cleaning Cycles

---

OFF_LINE_CLEAN_C P06      XX CYCLES
--

Once the fan set is switched off, Off Line Cleaning is initiated and completes the number of cycles selected here. You can choose anything between 0 and 15 cycles. If the setting is "0", Off Line Cleaning is switched off.

#### 7.7. P07 Star/Triangle switch over Time

---

ST_TR_SW_TIME____ P07      XXX SEC
---------------------------------------

After the fan set is switched on, outputs K1 (mains contactors) and K3 (star contactors) are activated. At the end of the **star/triangle switch-over time**, output K3 (star contactor) is switched off, and output K2 (triangle contactor) is activated with a delay of approximately 0,5 seconds.

#### 7.8. P09 Cleaning Pulse interval 1

---

PULSE_INTERVAL_1 P09      XXX SEC
--------------------------------------

**Cleaning Pulse interval** is the time in seconds between cleaning pulses when cleaning is operational.

#### 7.9. P12 Cleaning valve Pulse time

---

CLEAN_PULSE_TIME P12      XXX MS
-------------------------------------

The **pulse time** for the cleaning valves is the time for which the solenoids are energised each pulse. Factory default setting is 100 milliseconds – this is suitable for most Afterfilter types however please refer to the specific installation and operation manual for your unit type to verify the correct pulse time and adjust this parameter if required.

#### 7.10. P15 display Language

---

DISPLAY_LANG____ P15      ENGLISH
--------------------------------------

The display text can be output in eight different languages. The default language is English, but you can also choose one of following languages: German, French, Dutch, Italian, Spanish, Danish, and Swedish. The set language will be used in all menu's and modes.

### 7.11. P17 Function of Input I1 (terminals 26-28)

These terminals allow an external volt free contact to be used to signal an input to the TCB. The contact should be a normally closed contact, so an input signal is generated when the contact opens.  
(These terminals are supplied bridged).

Parameter value	Display	Description
0	INPUT_FUNCT_I1__ P17_0__NO_FUNCT	Input I1 or I2 has no function
1	INPUT_FUNCT_I1__ P17_1__ALARM.	When contact opens on Input, The system will give an Alarm message
2	INPUT_FUNCT_I1__ P17_2_EXT_CLEA_1	When contact opens on Input, cleaning is activated with interval 1. Cleaning will be activated until the contact is closed
3	INPUT_FUNCT_I1__ P17_3_EXT_CLEA_2	When contact opens on Input, cleaning is activated with interval 2. Cleaning will be activated until the contact is closed
4	INPUT_FUNCT_I1__ P17_4_STOP_CLEAN	When contact opens on Input, cleaning remains active until a full cleaning cycle is completed. When the contact closes again the cleaning will not start again based on this input.
5	INPUT_FUNCT_I1__ P17_5_URG_CLE_ST	When contact opens on Input, Cleaning stops immediately and the valve number of the last activated valve is stored. When the contact closes again the cleaning will not start again based on this input.
6	INPUT_FUNCT_I1__ P17_6_STOP_ALL__	When contact opens on Input, Fan and Cleaning stops immediately, the valve number of the last activated valve is stored. When the contact closes again the fan will restart again but the cleaning will not start again based on this input.
7	INPUT_FUNCT_I1__ P17_7_EMERG_STOP	When contact opens on Input, Fan and Cleaning stops immediately, the valve number of the last activated valve is stored. The system will also generate an Alarm message. When the contact closes again the fan will NOT restart again and also the cleaning will NOT start again based on this input.
8	INPUT_FUNCT_I1__ P17_8_CONF_AL_O1	When contact opens on Input I1, the Alarm messages of Output O1 is cleared/confirmed
9	INPUT_FUNCT_I1__ P17_9_CONF_AL_O2	When contact opens on Input I2, the Alarm messages of Optional Output O2 is cleared/confirmed



*When the cleaning stops using input signal option 4, 5, 6 or 7, it will not restart when the input contact closes again, but only when the differential pressure measurement or a different input signal causes a restart.*



*Input functions 2 – 6 and 7 & 8 are not available when the TCB is used to operate several fans in ECB mode.*

### 7.12. P18 Function of Input I2 (terminals 27-28)

These terminals provide the facility for a second programmable input. Setting options and function as for I1 - See chapter 7.11.

### 7.13. P19 Function of output relay O1 (Relay contact cleaning on / terminals 10-11)

A programmable output (voltage free relay) is available at terminals 10 and 11 – the contact is normally open. This can be programmed to close under a number of different conditions as detailed in the table below.

Parameter value	Display	Description
0	OUTPUT_FUNCT_O1_ P19_0__NO_FUNC__	Output O1 or O2 has no function
1	OUTPUT_FUNCT_O1_ P19_1_CLEAN_ON__	Output relay is activated (Contacts closed) when cleaning is active
2	OUTPUT_FUNCT_O1_ P19_2_FAN_ON	Output relay is activated (Contacts closed) when fan is running
3	OUTPUT_FUNCT_O1_ P19_3_FAN_ON+__	Output relay is activated (Contacts closed) when fan is running or (off line) cleaning is active
4	OUTPUT_FUNCT_O1_ P19_4_DP_MAX_AL	Output relay is activated (Contacts closed) when Delta P Max Alarm is active
5	OUTPUT_FUNCT_O1_ P19_5_LOW_PRE_AL	Output relay is activated (Contacts closed) when Low Pressure Alarm is active
6	OUTPUT_FUNCT_O1_ P19_6_FAN_ALARM	Output relay is activated (Contacts closed) when Fan Alarm is active



*Alarm communication: These Alarm output relays stay active, it will only be de-activated by a confirmation of the alarm by the ENTER button or remotely by a signal on Input I1 or I2.*



*These output functions are not available when the TCB is used to operate several fans in ECB mode. (The relays are then used to power the fan contactors for fans 4 and the working area lighting circuit).*

### 7.14. P20 Function of Optional output relay O2 (Relay contact start extracting equipment / terminals 12-13)

If this option is supplied a second programmable output is available at terminals 12 and 13. Details and possible setting options are as for O1 - See chapter 7.13.

### 7.15. P22 Delta P Cleaning mode

Delta P Cleaning mode	DP_CLEAN_MODE____ P22_0_CONT_CLEAN_	Cleaning is not influenced by the differential pressure measurement, but instead the valves will pulse continuously. Differential pressure measurement and monitoring are activated.
	DP_CLEAN_MODE____ P22_1_STOP_&_GO	Cleaning is carried out based on the differential pressure measurement. On a cleaning stop command, the valve number of the last activated valve is stored. On the next cleaning start command, cleaning begins with the valve with the next higher valve number.
	DP_CLEAN_MODE____ P22_2_STOP_&_END	Cleaning is carried out based on the differential pressure measurement. On a cleaning stop command, cleaning remains active until a full cycle is completed. On the next cleaning start command, the cleaning begins with the first valve. This is used as default setting.
	DP_CLEAN_MODE____ P22_3_OFF_LINE_	Only differential pressure measurement and monitoring are activated. All cleaning control functions based on Delta P are deactivated. The only cleaning option is now Off-Line Cleaning according the number of cycles defined in parameter P06 or via an external command on input I1 or I2.



*When off line cleaning is activated (option 3), make sure that parameter P06 (number of off-line cleaning cycles) is not set to zero. Otherwise the unit will never start to pulse clean the filter elements.*



*Multi fan ECB units operating with Explosive powder will only clean off-line and P22 parameter has no effect. A number of offline clean cycles must be set – otherwise cleaning will not be initiated.*

### 7.16. P26 Number of valves

NUMBER_VALVES____ P26____XXX_VALVES
--

Configuration of the number of valves connected to the controller. When the controller starts, all valves are addressed and checked. If a valve has failed, it is skipped.

### 7.17. P40 Time/Date Display

T/D_DISPLAY____ P40_A__AUTOMATIC
-------------------------------------

T/D_DISPLAY____ P40_0S____FIXED
------------------------------------

T/D_DISPLAY____ P40_0W____FIXED
------------------------------------

Setting of the current time of the system: Os = summer time, Ow = winter time, and A = Automatic setting of summer- and wintertime depending on date and time settings in the system (Parameter P41).

#### 7.18. P41 Set Time and Date

DATE_____
P41____DD.MM.20YY
TIME_____
P41_____HH:MM

Setting of the current time and date.



*The time and date setting must be re-set after the battery has been removed / changed.*

#### 7.19. P44 Program Version

PROGRAM_VERSION_
P44_VXX.XX.XX/X

This parameter field shows the version of the software. The update and/or uploading of new software can only be done by a Nordson representative.

#### 7.20. P46 Active Pulse Display

ACTIVE_PULSE_____
P46_VALVE__XX_YY

This parameter field shows the number of the valve that is last activated.  
XX = Number of the module / YY = Number of the valve

#### 7.21. P48 Test Display

TEST_CONTROLLER_
P48_____RUNNING
TEST_CONTROLLER_
P48_____END

During this test, all LED's on the control panel will light up for 10 seconds to be able to detect defective LED's.

### 7.22. P50 Back To Factory Settings

FACTORY_SETTINGS
P50_____YES
FACTORY_SETTINGS
P50_____CONFIRM

With this parameter the system will reset all the parameters as described in the next table to default factory settings.

Code	Description	Display line	Factory settings
P02	Delta P Min	DP_MIN_____ P02_____XXX_daPa	40 daPa
P03	Delta P Max	DP_MAX_____ P03_____XXX_daPa	80 daPa
P04	Delta P Max Alarm	DP_MAX_ALARM_____ P04_____XXX_daPa	150 daPa
P05	Low Pressure Alarm	LOW_PRESS_ALARM_____ P05_____XXX_daPa	0 daPa
P06	Off line Cleaning cycles	OFF_LINE_CLEAN_C_____ P06_____XX_CYCLES	0
P07	Star/Triangle switch over time	ST_TR_SW_TIME_____ P07_____XXX_SEC	5 s
P09	Cleaning Pulse interval 1	PULSE_INTERVAL_1_____ P09_____XXX_SEC	10 s
P12	Cleaning valve Pulse time	CLEAN_PULSE_TIME_____ P12_____XXX_MS	100 ms
P22	Delta P Cleaning mode	DP_CLEAN_MODE_____ P22_2_STOP_&_END	Stop and End

The settings will be reset by pressing the enter button for more then 2 seconds. The system will ask for a confirmation after which the enter button needs to be pressed again for more then 2 seconds.

### 7.23. M05 Total Operating Hours

TOTAL_OPERAT_H____
M05_xxxxxx_HOURS

Display of active operating hours (with running fan) of the control box since start-up.



## 8. ALARM MESSAGES AND FAULT LOCATION

The TCB control box will display an alarm message when it detects a possibly dangerous situation for the installation. When this happens first of all it is necessary to investigate the cause of the alarm. After correcting the input signals to the control board, the alarm needs to be relieved by pressing the ENTER button.

Alarm code	Display line	Alarm description
E01	_FAN_ALARM_____ E01__HH:MM_____	Fan Alarm. Fan overload contactor tripped.
E02	_COMM_ALARM_____ E02__HH:MM_____	Communication alarm A bus component connected is not responding (e.g. slave module, I/O Module )
E05	LOW PRES_AL_daPA E05__HH:MM__XXX__	Low Pressure Alarm After fan start the differential pressure is below the set value P05
E06	DP_MAX_AL_(daPA) E06__HH:MM__XXX__	DP Max Alarm The differential pressure is above the set value P04
E07	_DATA_ALARM_____ E07__HH:MM_____	Data alarm Data has been lost. All parameter values must be checked and corrected if necessary
E08	_ALARM_INPUT_I1_____ E08__hh:mm_____	Error message / Alarm on Input I1
E09	_ALARM_INPUT_I2_____ E09__hh:mm_____	Error message / Alarm on Input I2
E10	LOW BATTERY / SET TIME E10__HH:MM_____	Low battery for real time clock or incorrect time setting.
E11	DP SENSOR ALARM E11__HH:MM_____	Wrong connection of Delta P when Delta P is smaller then 0
E12	EMERG STOP E12__HH:MM_____	Emergency stop of fan set and cleaning based on input signal option 7 (see chapter 7.11)
E13	HIGH DP SYS.STOP E13__HH:MM_____	After an off-line cleaning cycle of an ECB unit the pressure drop has remained above the set DP Max level.



*When any of the above alarms are active it will be impossible to start up the fan set. Unless the alarm triggers a shutdown, the fan set will keep running when it was already activated before the alarm.*

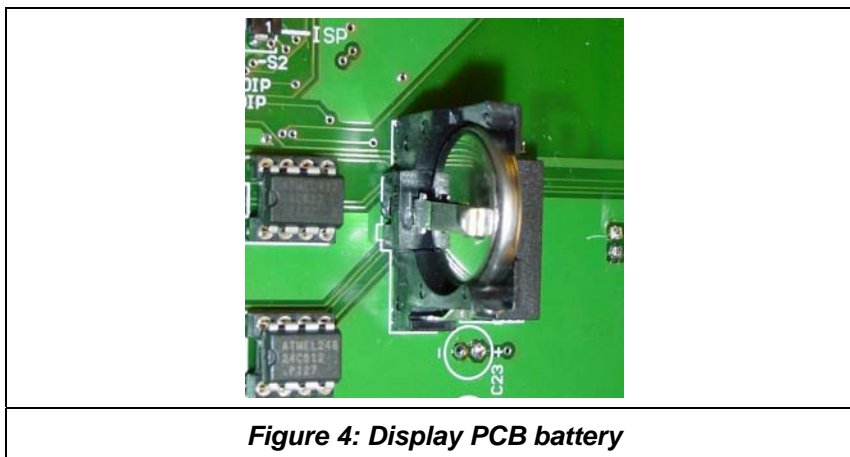
	Symptom	Possible cause	Action
<b>A</b>	Green power-on LED on module PCB not illuminated.	Electrical supply fault.	Check supply circuit for proper voltage, fuses, circuit breakers etc. Replace as required.
		Fuse on PCB module blown.	Check wiring connections and replace fuse with correct type (refer to chapter 11: Maintenance).
		Internal controller failure.	Replace PCB.
<b>B</b>	Fan does not start and LED 'Fan on' (item 7 fig. 1) is not illuminated.	Main switch on control box open	Turn main switch to ON-position.
		Electrical supply fault	Check supply circuit for proper voltage, fuses, circuit breakers etc. Replace as required.
<b>C</b>	The control board is operational, but the fan does not start. No failure is indicated.	Blown fuse	Check the circuit and change fuse F3 (see wiring diagram supplied with TCB).
<b>D</b>	The automatic circuit breaker switches off while the fan starts-up	Delay time between star and triangle is too short.	Increase change-over time (see chapter 7.7)
		Incorrect fan overload setting	Check fan overload setting
<b>E</b>	The fan only works in star operation when the unit is switched on; in triangle the fan stops.	Contactors K2 defective.	Change contactor K2 (see wiring diagram supplied with TCB)
		Incorrect wiring to fan	Check wiring from TCB to fan
<b>F</b>	No cleaning pulses but the LED 'Pulse cleaning' (item 7, fig. 1) is blinking.	Low supply voltage.	Check supply voltage (a low voltage will not open valves but may operate LED's normally).
		Lack of compressed air for cleaning.	Increase compressed air pressure for manifold to 6 – 7 bar.
		Solenoid valves not connected correctly.	Check connections to solenoid valves in enclosure or external valve enclosures. Ensure connection plug is correctly engaged in PCB socket.
		Solenoid valve failure	Check for proper valve action and repair or replace if necessary.
		Diaphragm valve failure	Check for proper valve action and repair or replace if necessary
<b>G</b>	No off-line cleaning.	Off-line cleaning not activated.	Set up controller to off-line cleaning mode (refer to chapter 7.15).
		Off-line cleaning cycles set to '0'	Increase number of off-line cleaning cycles (refer to chapter 7.6)
<b>H</b>	Incorrect/gaps in valve firing sequence.	Solenoid valves not connected correctly.	Check connections to solenoid valves in enclosure or external valve enclosures. Ensure connection plug is correctly engaged in PCB socket.
<b>I</b>	Incorrect $\Delta P$ reading.	Loose connections on $\Delta P$ pressure lines.	Check connections for leaks.
<b>J</b>	Incorrect 4-20mA output.	External circuit resistance too high.	Reduce external circuit resistance (recommended range 150-250 $\Omega$ ).
		$\Delta P$ problem	Refer to section I of Fault Location Table.

	Symptom	Possible cause	Action
<b>K</b>	Weak pulses.	Air supply inadequate.	Check compressor capacity. Check pulse interval – air pressure in manifold should return to required value before next pulse.
		Supply voltage too low.	Check supply voltage and connections to Control box.
<b>L</b>	LED bar graph pulsing	$\Delta P$ is below -20 daPa	Reverse pressure drop tubing connections
<b>M</b>	E 01: Fan alarm	Lack of proper system flow or open access to ambient	Close open hopper discharge or other openings. Do not attempt to run without inlet ducting attached.
		System airflow exceeds the rated flow	Adjust inlet or outlet damper(s)
		Faulty motor	Repair or replace as required.
		Automatic circuit breaker is OK but a missing connection between terminal 33-34	Check and repair the connection
<b>N</b>	E 02: Communication alarm	RS-485 bus link between system components not functioning.	Check bus link wiring.
		Slave modules not responding	Check mode and module switch settings on slave modules.
<b>O</b>	E 05: Low pressure alarm	Faulty parameter settings	Check parameter settings (see chapter 7.5).
		$\Delta P$ problem	Refer to section I of Fault Location Table.
		Fan motor fault	Check operation of fan motor
		Ducting restricted or blocked	Check ducting system
		Filter elements damaged	Check condition of all filter elements. If necessary replace all filter elements at the same time.
<b>P</b>	E 06: DeltaP max alarm	Faulty parameter settings	Check parameter settings (see chapter 7.4)
		$\Delta P$ problem	Refer to section I of Fault Location Table.
		Low compressed air pressure	Check reverse-jet pulsing system. Increase manifold pressure to 6 – 7 bar.
		End of useful filter element life	Replace filter elements as a complete set
<b>Q</b>	E 07: Data alarm	Data lost from memory	Check all parameters and correct if necessary.
<b>R</b>	E 10: Low battery / Check Time	Low battery for real-time clock / incorrect clock settings	Check / Replace battery on front PCB module (see picture in chapter 9). Correct type is CR2032. Re-set time and date.
<b>S</b>	E 11: Negative DeltaP measurement	Pneumatic tubing connections incorrect	Reverse the pressure drop tubing connections. If a safety filter (Micrafilter) is present it has to be in the dirty air plenum tubing (both tubes for explosive powder applications).
<b>T</b>	E13 : High DP after ECB clean cycle	High DP on ECB unit after cleaning	Refer to section P (E06 high DeltaP) above.

## 9. MAINTENANCE

In general the TCB control box does not require any maintenance. There are some items however that need to be checked on a regular basis:

- In-line Microfilters in the air lines: when these are very dirty, there will be a pressure drop over them, making the differential pressure measurement over the elements unreliable.
- Air lines and cable glands to and from control box should be checked for damage and/or tightness. If these become loose, the values shown on the display may not be accurate, and possibly powder or moisture will be able to enter the enclosure causing damages and possible short-circuits.
- The clock on the front PCB has a CR 2032 battery. This battery will deplete over time and needs to be changed as soon as the alarm message is displayed. In order to do this, the cover over the front PCB needs to be removed first. Make sure to mount the battery with the '+' side facing to the right of the PCB.
- Re-set the time and date after replacing the battery.



**Figure 4: Display PCB battery**

## 10. OPTIONS AND FEATURES

In addition to the features already described, the Total Control Board has some extra options and settings built-in to provide additional functions and data recording / information retrieval capabilities. These following options can only be accessed and installed by a Nordson representative, so please consult your local Nordson representative for more information.

- Forced cleaning time: initiates a forced cleaning cycle at a specified time interval.
- Fan run-on time: fan set remains activated during a certain period after system is switched off.
- Optional input signal: possibility to initiate for example an alarm to stop cleaning cycle.
- Optional output signal: possibility to start for example a rotary airlock on off-line cleaning.
- DeltaP sensor type: possibility to measure DeltaP over filter elements by a 4-20 mA pressure transducer.
- Thermistor module for fan motor protection.
- 4-20mA Output proportional to measured pressure drop.



*The options mentioned above can also cause alarm messages to be displayed on the TCB. Relieving the alarm is done in the same way by pressing the ENTER button after correcting the input to the control board.*

## 11. SPECIFICATIONS

Printed Circuit Boards	Data
Supply voltage	24 V (AC or DC): -0%/+10%
Back-Up Battery	CR 2032. 3 Volts
Bus	RS-485 bus link with 9600 Baud bit rate
Inputs Signal	Potential free contacts only
Differential Pressure Transducer	0-500 daPa, Display Range 0-500 daPa. Accuracy - 2,5%
Signal output (Option)	4-20mA output proportional to differential pressure of 0 – 500 daPa
Relay outputs	Max. 2 A, 250 VAC or 1 A, 30 VDC
Valve outputs	24 V DC Single I/O module system - Max. 1,9 A (2 x 22W Valve per output) Slave I/O modules - Max. 1.0 A (1 x 22W Valve per output)
Fuse	I/O Module T 2,0 A, 250 VAC, 5 x 20 mm Display – PTC Device.
Dimensions	Display PCB. 258 x 175 x 65 mm I/O Module PCB 220 x 80 mm

## 12. SPARE PARTS

ITEM	Nordson Part No.
TCB,DISPLAY,CONTROLLER,GEN5 A/F	7034116
TCB, I/O MODULE,GEN5 A/F	7034117
Combination of 1 & 2	TBC
Slave Module PCB (Valve outputs only)	TBC
Solenoid valves for Slave modules 3.2mm orifice (DLM Collectors)	TBC



### 13. EC DECLARATION OF CONFORMITY



Entwicklung

EG-Konformationserklärung nach Artikel 10.1 der Richtlinie 89/336/EWG und 73/23EWG  
(EMV-Richtlinie, Niederspannungsrichtlinie)  
EC-Declaration of Conformity acc. to Article 10.1 of the Directive 89/336/EEC and 73/23/EEC  
(EMC-Directive)  
Déclaration de conformité CEE selon l'article 10.1 de la directive 89/336/CEE + 73/23CEE  
(Directive EMC)

Wir,

**Reco GmbH**

We, Ettore-Bugatti Strasse 9  
Nous, 51149 Köln, Allemagne

Name und Anschrift des Herstellers oder des in der EU niedergelassenen Inverkehrbringers  
Name and address of the manufacturer or of the introducer of the product who is established in the EU  
Nom et adresse du fabricant ou de la personne résidant dans la CEE qui introduit le sous-dit produit de la CEE

erklären in alleiniger Verantwortung, dass das Produkt  
herewith take the sole responsibility to confirm that the product  
soussignés déclarons de notre seule responsabilité que ce produit

#### Total Control Board

Typenbezeichnung und ggf. Artikel Nummer  
Type designation and, if applicable, article no.  
Type, nom et - si nécessaire - n° d'article du produit

mit den folgenden Normen bzw. normativen Dokumenten übereinstimmt  
is in accordance with the following standards or standardized documents  
est conforme aux normes ou spécifications Européennes suivantes

- |    |   |  |
|----|---|--|
| 1. | <b>EN 61000-6-4:2001</b><br>EN 55011:1998 Gr. 1 Kl. A<br>EN 55011:1998 Gr. 1 Kl. A<br>EN 61000-3-2:2001<br>EN 61000-3-3:1995 + A1:2001  | <b>Störaussendung EMA [RF emission]</b><br>Störspannung [conducted noise]<br>Störfeldstärke [radiated noise]<br>Oberschwingungen [harmonics]<br>Spannungsschwankungen [flicker]        |
| 2. | <b>EN 61000-6-2:2001</b><br>EN 61000-4-6:1996 + A1:2001<br>EN 61000-4-3:1996 + A1:1998 + A2:2001<br>EN 61000-4-4:1995 + A1:2001<br>EN 61000-4-5:1995 + A1:2001<br>EN 61000-4-11:1994 + A1:2000<br>EN 61000-4-2:1995 + A1:1998 + A2:2001 | <b>Störfestigkeit EMB [immunity]</b><br>HF-Einströmung [injected HF currents]<br>HF-Felder [radiated HF fields]<br>Burst<br>Surge<br>Spannungs-Variationen [voltage variations]<br>ESD |
| 3. | <b>EWG 73/23</b><br>VDE 0160<br>VDE 0113 EN 60204 Teil 1 A1: 2006   | <b>Niederspannungsrichtlinie</b><br>Elektronische Betriebsmittel<br>Sicherheit Elektrischer Maschinen  |

Folgende Betriebsbedingungen und Einsatzumgebungen gemäß Dokumentation sind  
voraussetzen

The operating conditions and installation arrangements have to be presumed according  
documentation.

Les conditions d'opération et d'installation suivantes sont à respecter

Dieser Erklärung liegt der Prüfbericht zugrunde

This confirmation is based on testreport

Cette confirmation est basée sur report de test

**RECO Gesellschaft für**  
**Industriefilter-Regelung mbH** TÜV Rheinland Product Safety GmbH, 51101 Köln, Allemagne  
**Ettore-Bugatti-Straße 9**  
**51149 Köln - Germany**

Tel.: +49(0)2203/93583-0 Fax:

Name, Anschrift, Datum und Unterschrift  
Name, address, date and legally binding signature of the person being responsible  
Nom, adresse, date et signature de la personne responsable





## 14. CONTACT ADDRESS

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40699 Erkrath  
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