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A. Supplement 2704 Melt Pressure Controller

A.1. INTRODUCTION

The aim of this addendum is to describe the operation and configuration of the 2704MP controller. It should be used together with the following Installation and Operation Handbooks:

2704 Installation and operation handbook, part no. HA026502,

2704 Engineering Handbook part no. HA026933

These handbooks are also available on <http://www.eurotherm.co.uk/pdfs>.

It is assumed that the reader is familiar with the melt pressure application. An Application Note is available on request.

A.2. WHAT IS THE MELT PRESSURE CONTROLLER?

The 2704MP is a fully programmable melt pressure controller suitable for precision pressure control in the plastics extrusion industries.

It is supplied in two formats:-

1. With a single input configured for pressure measurement from a melt pressure transducer.
OR
2. With two inputs to provide the additional facility for differential pressure measurement and alarm across the screen.

Both formats are supplied with:

- An analogue output to control the extruder screw
- Alarms to detect high and low pressure conditions. The alarms can signal a screen blockage when the differential pressure between the two transducers exceeds a preset value
- Transducer power supplies provide the excitation voltage at 10Vdc for the strain gauge bridge transducers. An automatic shunt calibration procedure is provided for each input

Modules are fitted as follows:-

- Slot 1: DC Control
- Slot 3: PV Input (only when the second input for differential measurement is supplied)
- Slot 4: Transducer Power Supply
- Slot5: Transducer Power Supply (only when the second input for differential measurement is supplied)
- Slot 6: Dual Relay

A.3. INSTALLATION

The Melt Pressure controller should be installed as described in Chapter 2 of the Installation and Operation Handbook.

WARNING



You must ensure that the controller is correctly configured for your application. Incorrect configuration could result in damage to the process being controlled, and/or personal injury. It is your responsibility, as the installer, to ensure that the configuration is correct. See 2704 Engineering Handbooks for details.

A.4. WIRING CONNECTIONS

Before proceeding further, please read Appendix B, Safety and EMC information, in the above handbooks.

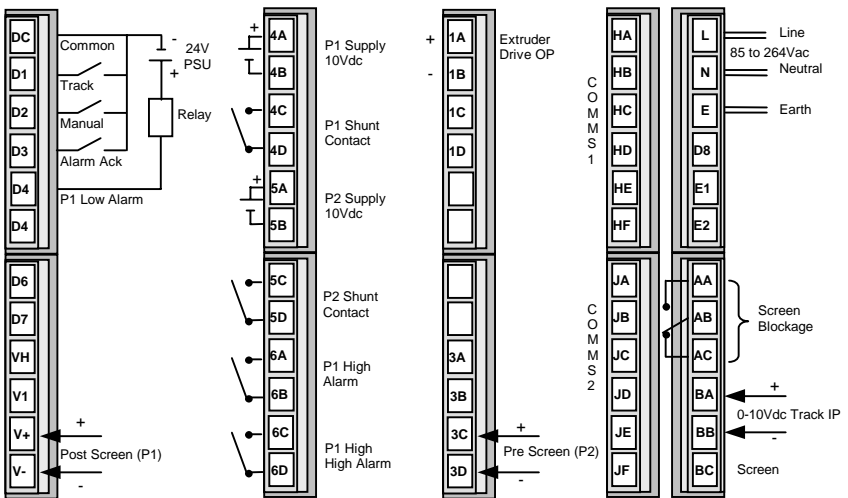


Figure A-1: Terminal Connections

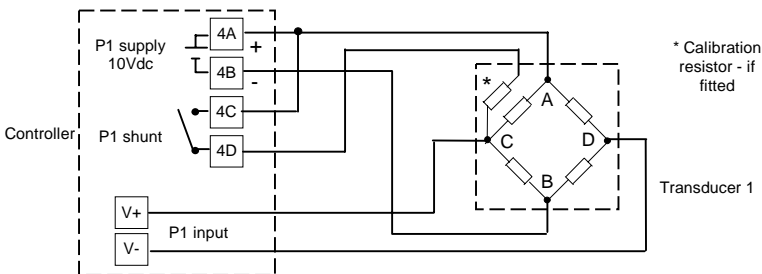
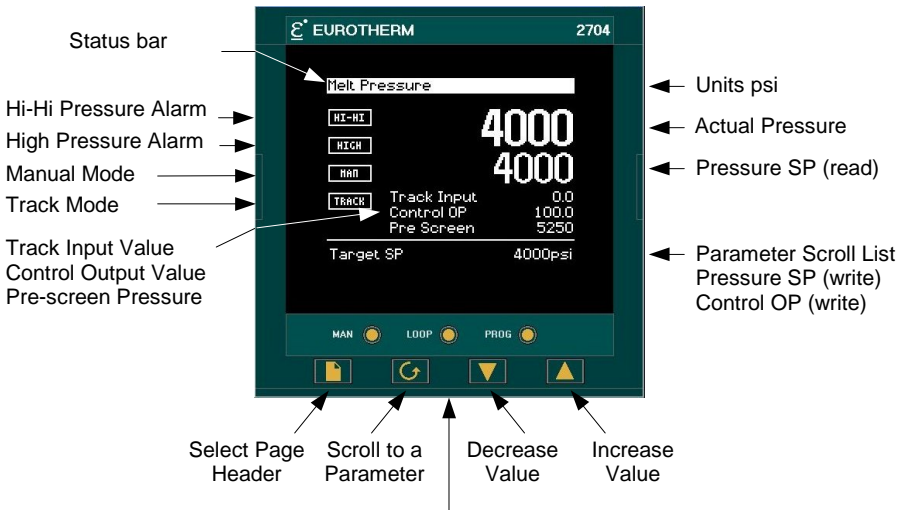


Figure A-2: Example Wiring for a Single Transducer

A.5. SWITCH ON

A short self-test sequence takes place during which the controller identification is displayed together with the version number of the software fitted. For the melt pressure controller the version number must be greater than 5.0.



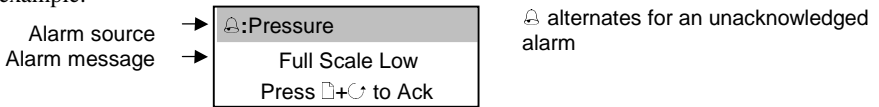
The Loop Select button switches between a Melt Pressure Trend view and the Overview. It is also used to return to either of these views from any other screen.

Figure A-3: Operator View

A.5.1. Alarm Indication

If an alarm is present the relevant red alarm beacon will flash. The type and source of the alarm is indicated by a message.

For example:-



If more than one alarm is present the next alarm message is shown when the first has been acknowledged by pressing and together. When an alarm is acknowledged, but is still present, the relevant beacon will illuminate continuously and the message will cease.

If the alarm is no longer present when acknowledged the alarm beacon will extinguish.



Further information on alarms is given in the User Guide and Engineering handbooks.

A.6. START UP MODES

It is very often required to start an extrusion line in manual mode. That is the screw speed is under the control of the operator. To allow for this the Melt Pressure controller can be set to start in manual mode with a minimum output power demand. There are three possible start up modes:-

A.6.1. Manual






In this mode the output power (which determines the extruder speed) can be adjusted manually from the front panel of the controller using the  or  buttons.

Manual start up is achieved by making a switch contact between terminals DC (digital input common) and D2 (digital input 2). The MAN indicator will be highlighted.

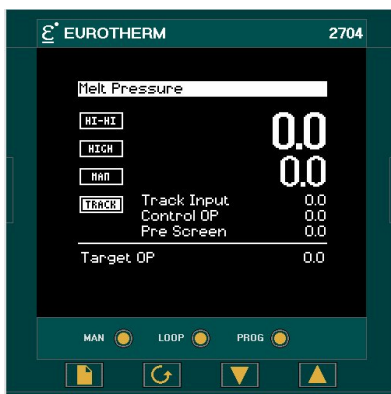
In addition to entering manual mode using an external switch, manual mode can be entered by pressing the MAN button on the front panel of the controller.

A.6.1.1. To View and Adjust the Extruder Speed:-

Press  to select the 'Target OP' parameter on the parameter scroll list. The flashing underline indicates that the value can be changed.

Press  or  buttons to raise or lower the speed indicated by the Target OP value in %.

A.6.2. Track



In this mode the controller output value (which determines the extruder speed) can be adjusted manually from an external potentiometer. This allows the extruder speed to be adjusted from a remote location.

It is achieved by making a switch contact between terminals DC (digital input common) and D1 (digital input 1). The TRACK indicator will be highlighted.



Care should be taken to ensure that the potentiometer is adjusted to minimum speed position when the system is first started.

A.6.3. Automatic



The controller output value (which controls the extruder speed) is determined under closed loop PID control.

The pressure is set by adjusting the setpoint as described below.

The controller operates in this mode when neither digital input is made.

A.6.3.1. To View and Adjust the Pressure Setpoint:-

Press (if necessary) to select the 'Target SP' parameter on the parameter scroll list. The flashing underline indicates that the value can be changed.

Press to increase the setpoint

Press to decrease the setpoint



To select the Operator View from any other view press the LOOP button

A.7. BASIC NAVIGATION – LEVEL 1

A full description of instrument navigation is given in the User Guide and Engineering handbooks. Below is a summary.

Parameters which can be adjusted are organised into pages, each associated with a particular subject. The pages for the Melt Pressure Controller are 'Pressure Alarms', 'Calibration' and 'Access' to other levels. The page headers are always found by pressing .

Parameters within the page are accessed by pressing .

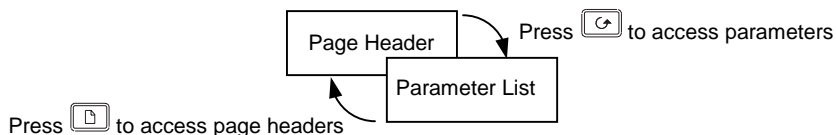


Figure A-4: Basic Navigation




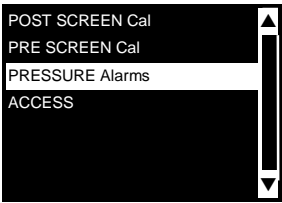



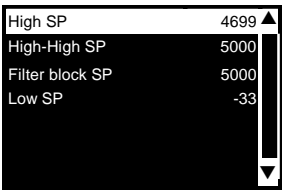




A.8. ALARMS

Four alarms are pre-configured and ready for use. They are:-

High Alarm for the main melt pressure	Can be used as an indication of increasing pressure
High-High alarm for the main melt pressure	Can be used to turn off the drive
Low alarm for the main melt pressure	Can be used as an indication of decreasing pressure
Differential alarm between the two pressure measurements	Can be used to indicate blockage of the screen and can be used to initiate an automatic screen change

The alarm parameters are grouped under page headings in exactly the same way as other parameters.

A.8.1. To Set the Alarm Setpoints

Do This	This Is The Display You Should See	Additional Notes
<p>1. From any display press  as many times as necessary to access the page header menu</p> <p>2. Press  or  to select 'PRESSURE Alarms'</p>		
<p>4. Press  to display the list of alarms</p> <p>5. Press  or  to scroll around the alarms list</p>		
<p>10. For the chosen alarm, press  to edit the value</p> <p>11. Press  or  to change the value</p>		<p>The flashing underline indicates the value can be changed</p>

A.9. CALIBRATION




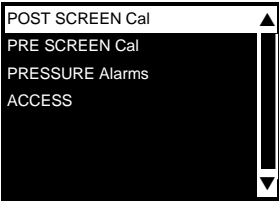







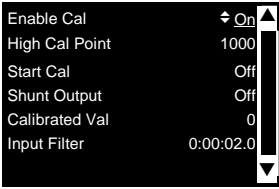




The input signal mV and corresponding display range are specified at the time of ordering in accordance with the order code, section A10.

To calibrate the controller to the actual transducer in use, a calibration routine can be initiated using the front panel buttons. Both transducers with or without incorporated calibration resistors can be accommodated.

Calibration parameters are grouped under page headings in the same way as other parameters.

A.9.1. To Calibrate the Post Screen Pressure Transducer



The calibration procedure must be performed when the transducer is measuring zero pressure.



Do This	This Is The Display You Should See	Additional Notes
<p>1. From any display press  as many times as necessary to access the page header menu</p> <p>2. Press  or  to select 'POST SCREEN Cal'</p>		
<p>3. Press  to display the list of calibration parameters</p> <p>4. Press  or  to scroll around the list, and select 'Enable Cal'</p>		
<p>5. Press  to edit</p> <p>6. Press  or  to select On</p>		<p>This gives access to the calibration parameters.</p> <p>The flashing underline indicates the value can be changed.</p>
<p>7. Press  to 'High Cal Point'</p> <p>8. Press  or  to set a value which is 80% of the range of the transducer</p>		<p>The example here assumes a transducer range 0 to 5000psi, giving a High Cal Point of 4000</p>

9. Press  to '**Start Cal**'

10. Press  or  to '**On**'

Enable Cal	On
High Cal Point	4000
Start Cal	On
Shunt Output	Off
Calibrated Val	0
Input Filter	0:00:02.0

To confirm, press  and  when prompted

- The controller will first perform a calibration at zero pressure. It will not start to calibrate until the pressure measurement is stable.
- It will then switch in the shunt calibration resistor which offsets the transducer bridge to read 80% of full range. By default the controller is supplied configured for transducers with an internal calibration resistor. For transducers which do not have an integral calibration resistor the controller will use its own internal resistor. It will, however, require configuration for this mode. Configuration is described in the Engineering Handbook, HA026933.
- The parameter '**Shunt Output**' will change to '**On**' to start calibration at 80% range. It will not start to calibrate until the pressure measurement is stable (at 80% range).
- The parameter '**Calibrated Val**' reads calibration values (0 and 4000) which correspond to the minimum input and maximum input from the transducer.
- If the calibration fails – for example because the readings do not stabilise – the message '**Txdcr Failed**' will appear and '**Press  and  to Ack**'.

A.9.2. To Calibrate the Pre Screen Pressure Transducer

Pre screen pressure requires a second transducer fitted before the screen. Using pre and post screen transducers allows differential pressure measurement across the screen. The calibration procedure is the same as that described above and must be performed when the transducer is measuring zero pressure:-

A.10. ORDERING CODE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
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1. Controller Type

2704MP	2704 Standard
2704MPf	2704 Profibus

2. Supply Voltage

VH	85-264Vac
VL	20-29Vac/dc

3. Pressure Inputs

1	1 Input
2	2 Inputs

4. Input 1 mV Elect Low

Enter Low mV Value e.g. 0.0

9. Input 2 mV Elect Low

Enter Low mV Value e.g. 0.0

5. Input 1 mV Elect High

Enter High mV Value e.g. 30.0

10. Input 2 mV Elect Hi

Enter High mV Value e.g. 30.0

6. Input 1 Eng Low

Enter Low Units Value e.g. 0

11. Input 2 Eng Low

Enter Low Units Value e.g. 0

7. Input1 Eng High

Enter High mV Value e.g. 5000

12. Input 2 Eng High

Enter High mV Value e.g. 5000

8. Input 1 Units

PSI	psi Units
BAR	Bar Units

13. Input 1 Units

PSI	psi Units
BAR	Bar Units

14. Control Output

4mA20	4-20mA
0mA20	0-20mA
0V10	0-10Vdc
0V5	0-5Vdc
1V5	1-5Vdc

15. H Comms Slot

XX	Not Fitted
A2	232 Modbus
Y2	2-wire 485 Modbus
F2	4-wire 485 Modbus
AE	232 Bisynch
YE	2-wire 485 Bisynch
FE	4-wire 485 Bisynch
PB	Profibus
DN	Devicenet

16. J Comms Slot

XX	Not Fitted
A2	232 Modbus
Y2	2-wire 485 Modbus
F2	4-wire 485 Modbus
M1	232 Master
M2	2-wire 485 Master
M3	4-wire 485 Master

17. Manual

ENG	English
FRA	French
GER	German

18. Toolkit Blocks

XX	Standard
U1	Toolkit Level 1
U2	Toolkit Level 2