A. SUPPLEMENT 2604 MELT PRESSURE CONTROLLER . 2

A. Supplement 2604 Melt Pressure Controller

A.1. INTRODUCTION

The aim of this addendum is to describe the operation and configuration of the 2604MP controller. It should be used together with the following Installation and Operation Handbooks:

2604 Installation and operation handbook, part no. HA026491

2604 Engineering Handbook part no. HA026761

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 2604MP 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 pre-set 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 2604 Engineering Handbooks for details.

A.4. WIRING CONNECTIONS

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

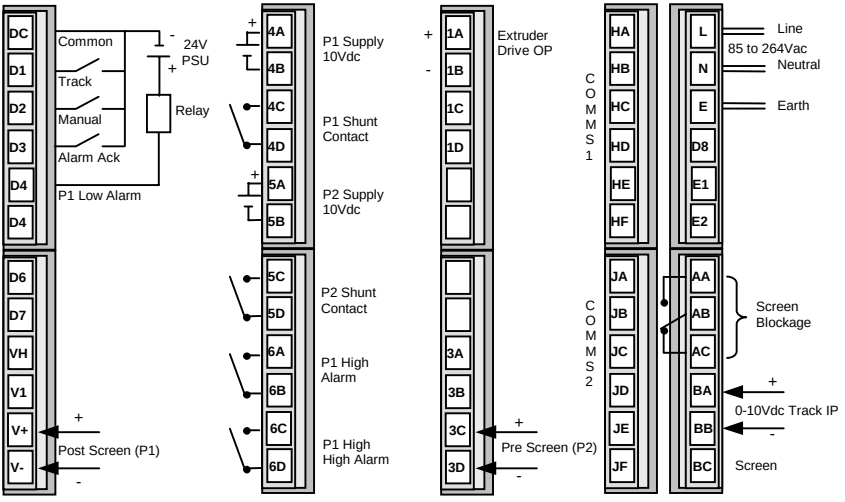


Figure A-1: Terminal Connections

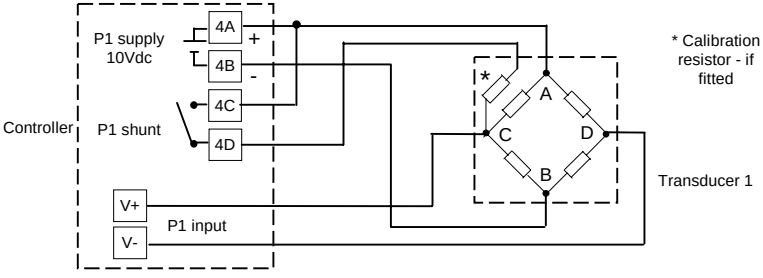


Figure A-2: Example Wiring for a Single Transducer

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.

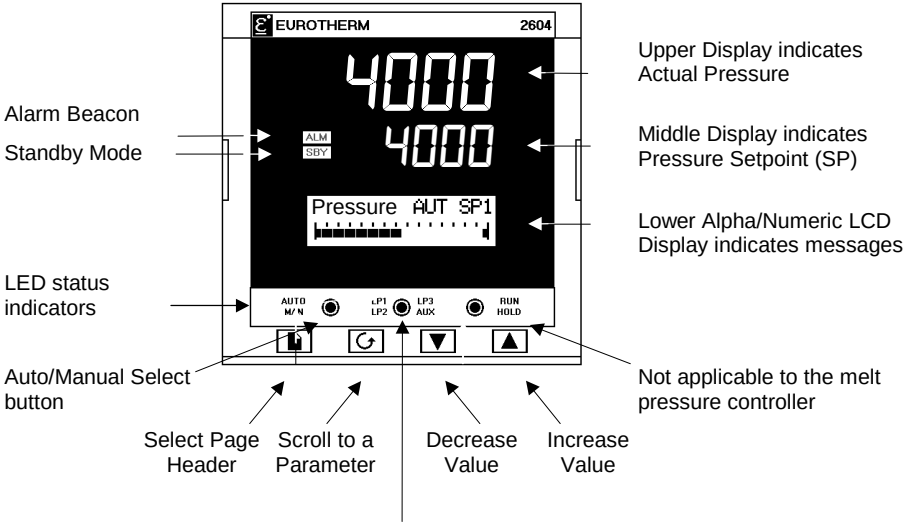
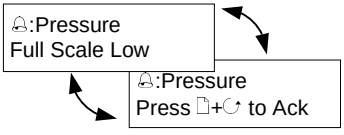


Figure A-3: Operator Overview

A.5.1. Alarm Indication

If an alarm is present the red alarm beacon will flash. The type of alarm will be indicated in the lower LED display.

For example:-



The display alternates between the 'Type' of alarm and how to acknowledge it.

If more than one alarm is present it is shown when the first has been acknowledged by pressing and together. When all alarms have been acknowledged, but are still present, the beacon will illuminate continuously and the messages will stop flashing in the LED display.

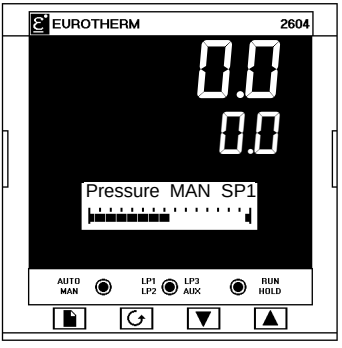
If the alarms are no longer present when they are acknowledged the alarm beacon will extinguish.

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 directly controlled by 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 Manually Adjust the Extruder Speed:-

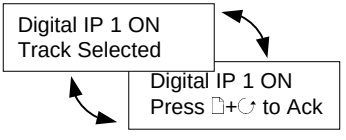
Press ▲ or ▼. The lower LCD display will show 'Target OP' → Target OP [%] ◆ 0

Press ▲ or ▼ again to raise or lower the speed indicated by the Target OP value in %.

A.6.2. Track

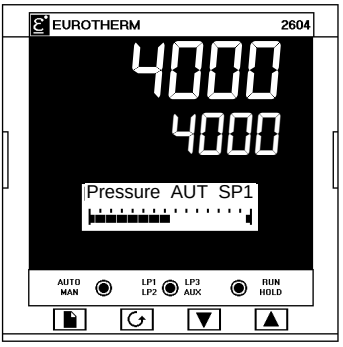
In this mode the controller output value (which determines the extruder speed) can be adjusted manually from an external potentiometer. This allows the extruder speed to be adjusted from a remote location.

It is achieved by making a switch contact between terminals DC (digital input common) and D1 (digital input 1). The lower display will show →



⚠ 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 ▲ or ▼. The lower LCD display will show 'Target SP' →

Target SP	
[psi]	◆ 4000

Press ▲ or ▼ again to raise or lower the pressure setpoint indicated by the Target SP value in psi.

i **The controller will return to the Operator Overview display 5 seconds after releasing the ▲ or ▼ buttons.**

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:-

- Press ↻ to access parameters (see following sections for the parameters available)
- Press ⎙ to access page headers (These are ACCESS and CALIBRATION)
- Press ▲ or ▼ to change an analogue value or a digital state.

A.8. ALARM SETPOINTS

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

- Main melt pressure High Alarm — Can be used as an indication of increasing pressure
- Main melt pressure High-High alarm — Can be used to turn off the drive
- Main melt pressure Low alarm — 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 to initiate an automatic screen change

The alarm setpoints are included in the following list of parameters.

From the Overview display:-

Do This	The Display You Should See	Additional Notes
1. Press [↻]	↻:Pre Screen [psi] 1.0	Read only display of the Pre Screen pressure.
2. Press [↻] 3. Press [▲] or [▼] to change the value	↻:Screen Alm SP [psi] ◆5000.0	Screen Alarm Setpoint. This is the differential between the two pressure measurements. ◆ indicates the value can be changed
4. Press [↻] 5. Press [▲] or [▼] to change the value	↻:Hi Alm SP [psi] ◆4000.0	High Alarm Setpoint for the main melt pressure.
6. Press [↻] 7. Press [▲] or [▼] to change the value	↻:Hi-Hi Alm SP [psi] ◆5000.0	High-High Alarm Setpoint for the main melt pressure.
8. Press [↻] 9. Press [▲] or [▼] to change the value	↻:Low Alm SP [psi] ◆0.0	Low Alarm Setpoint for the main melt pressure.
10. Press [↻]	↻:Control OP [%] 0.0	Read only display of the demand output to the drive
11. Press [↻] 12. Press [▲] or [▼] to change the value	↻:Pressure SP [psi] 4100.0	Pressure setpoint

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.

The calibration parameters are grouped under the page heading 'CALIBRATION'.

A.9.1. To Calibrate the Post Screen Pressure Transducer

Post screen pressure is measured after the screen. It is also the melt pressure if only one transducer is fitted. The calibration procedure must be performed when the transducer is measuring zero pressure.

Do This	The Display You Should See	Additional Notes
1. From any display press [page] as many times as necessary to access the **'CALIBRATION'** page header	[page]: CALIBRATION	
2. Press [scroll] to display **'Enable Cal'** 3. Press [▲] or [▼] to **'On'** to enable calibration	[scroll]: Enable cal ◆ On	This gives access to the calibration parameters. ◆ indicates that the value can be changed
4. Press [scroll] to display **'Post Screen Hi'** 5. Press [▲] or [▼] to set a value which is 80% of the range of the transducer	[scroll]: Post Screen Hi [psi] ◆ 4000	The example here assumes a transducer range 0 to 5000psi, giving a Post Screen high calibration point of 4000
6. Press [scroll] to **'Start Post Cal'** 7. Press [▲] or [▼] to **'On'**	[scroll]: Start Post Cal ◆ On	
8. To confirm, press [page] and [scroll] when prompted.	Txdcr 1 Cal Active Press [page]+[scroll] to Ack	

The controller starts the calibration procedure as follows →

- 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, HA026761.
- 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 [page] 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 must be performed when the transducer is measuring zero pressure:-

Do This	The Display You Should See	Additional Notes
1. Press [↻] to display **'Pre Screen Hi'** 2. Press [▲] or [▼] to set a value which is 80% of the range of the transducer	↻: Pre Screen Hi [psi] ◆4000	The example here assumes a transducer range 0 to 5000psi, giving a Pre Screen high calibration point of 4000
3. Press [↻] to **'Start Pre Cal'** 4. Press [▲] or [▼] to **'On'**	↻: Start Pre Cal ◆On	
5. To confirm, press [page] and [↻] when prompted	Txdcr 1 Cal Active Press page+↻ to Ack	
The controller starts the calibration procedure as described above		
6. Press [↻] to **'Post IP Screen'** 7. Press [▲] or [▼] to adjust	↻: Post IP Screen ◆0:00:02.0	If the melt pressure signal is 'noisy' a time constant can be applied to the measurement to smooth out unwanted disturbances. Maximum time is 10 minutes Mins can be adjusted by pressing ↻ and ▲ together.

A.10. ORDERING CODE

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

1. Controller Type	
2604MP	2604 Standard
2604MPf	2604 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

5. Input 1 mV Elect High
Enter High mV Value e.g. 30.0

6. Input 1 Eng Low
Enter Low Units Value e.g. 0

7. Input1 Eng High
Enter High mV Value e.g. 5000

8. Input 1 Units	
PSI	psi Units
BAR	Bar Units

9. Input 2 mV Elect Low
Enter Low mV Value e.g. 0.0

10. Input 2 mV Elect Hi
Enter High mV Value e.g. 30.0

11. Input 2 Eng Low
Enter Low Units Value e.g. 0

12. Input 2 Eng High
Enter High mV Value e.g. 5000

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