

**EUROTHERM  
DRIVES**

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## **584 ADDENDUM TO PRODUCT MANUAL**

Issue 3 Software New or  
Renamed Diagnostics and  
Parameters

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## WARNINGS AND INSTRUCTIONS

THESE WARNINGS AND INSTRUCTIONS ARE INCLUDED TO ENABLE THE USER TO OBTAIN THE MAXIMUM EFFECTIVITY AND TO ALERT THE USER TO SAFETY ISSUES


 **NEVER WORK ON THE CONTROLLER, MOTOR, OR AUXILIARY EQUIPMENT WITHOUT FIRST ISOLATING ALL SUPPLIES TO THE SYSTEM.**

**APPLICATION AREA:** Industrial (non consumer) motor speed control utilising A.C. induction or A.C. synchronous machines.

**PRODUCT MANUAL:** The product manual is to provide a description of how the product works and is not intended to describe how the apparatus works into which it may be installed.

This product manual is to be made available to all persons who are required to: design an application install and service or any other associated operation with this product.

**APPLICATION ADVICE:** Applications advice and training is available from Eurotherm Drives Ltd.

 **INSTALLATION:** Ensure that mechanically secure fixings are used as recommended.


**ENSURE THAT THE ENCLOSURE INTO WHICH THIS PRODUCT IS MOUNTED IS SUITABLE FOR THAT ENVIRONMENT (NOTE: THIS PRODUCT MAY BE IP00 OR IP20 AND HENCE REQUIRES FURTHER PROTECTION TO AVOID PERSONAL INJURY).**

Ensure that cooling and air flow around the product are as recommended.


Ensure that cables and wire terminations are as recommended and clamped to required torque.

Ensure that the installation and commissioning of this product are carried out by a competent person.

Ensure that the product rating is not exceeded.

 **APPLICATION RISK:** The integration of this product into other apparatus or system is not the responsibility of Eurotherm Drives Ltd as to its applicability, effectivity or safety of operation or of other apparatus or systems.

Where appropriate the user should consider some aspects of the following risk assessment.

 **RISK ASSESSMENT:** Under fault conditions or conditions not intended.

- |  |   |   |
|--|---|---|
| 1. The motor speed may be incorrect.   | } | In these situations the users own risk  |
| 2. The motor speed may be excessive  | } | assessment should provide either  |
| 3. The direction of rotation may be incorrect.   | } | sufficient guarding to prevent risk of injury or additional<br>redundant monitoring and safety systems. |
| 4. The motor may be energised unless the installation specifically prevents unexpected or unsequenced energisation of the motor.   |   |   |
| 5. Due to the use of electricity in this product, only competent persons may install or service this product and avoiding the danger of death by electrocution or burning by using established safe working practices. |   |   |
- In these situations the users own risk assessment should provide for example lockable isolators to provide safe working conditions.

NOTE: During power loss the product will not operate as specified.

**MAINTENANCE:** Maintenance and repair should only be performed by competent persons using only the recommended spares (or return to factory for repair). Use of incorrect parts may create a hazard and risk of injury.

 **WHEN REPLACING A PRODUCT IT IS ESSENTIAL THAT ALL USER DEFINED PARAMETERS THAT DEFINE THE PRODUCTS OPERATION ARE CORRECTLY INSTALLED BEFORE RETURNING TO USE. FAILURE TO DO SO MAY CREATE A HAZARD AND RISK OF INJURY.**

**PACKAGING:** The packaging is combustible and if disposed of in this manner incorrectly may lead to the generation of toxic fumes which are lethal.

**WEIGHT:** Consideration should be given to the weight of the product when handling.

**REPAIRS:** Repair reports can only be given if sufficient and accurate defect reporting is made by the user.

Remember, the product without the required precautions can represent an electrical hazard and risk of injury, and that rotating machinery is a mechanical hazard and risk of injury.

**PROTECTIVE INSULATION:**

1. All exposed metal insulation is protected by basic insulation and bonding to earth i.e. Class 1.

NOTE: Earth bonding is the responsibility of the installer.

2. All signal terminals (terminals 1-27) are protected by double insulation i.e. Class 2 insulation. The purpose of this protection is to allow safe connection to other low voltage equipment and is not designed to allow these terminals to be connected to any unisolated potential.

NOTE: Thermal sensors contained within the motor are to be double insulated.

3. Single fault conditions.

**CONTROLLER WARRANTY:** For further details on Eurotherm Drives Controller Warranty and Repair refer to the Standard Conditions of Sale IA058393C.

Eurotherm Drives reserve the right to change or alter the specification of this product without notice

# 584 ADDENDUM

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# ISSUE 3 SOFTWARE NEW OR RENAMED DIAGNOSTICS AND PARAMETERS

Drive information is organised as a set of menus with parameters relating to the same function stored under a common menu heading. The following paragraphs explain in detail each of the new or renamed menu headings contained in issue 3 software, and the parameter values or diagnostics contained therein. Only new or renamed diagnostics and parameters are covered in this addendum.

## CHAPTER 1 - Diagnostic Menu

The diagnostics menu allows the user to monitor operation of the drive. This includes items such as the motor current, speed setpoint, digital input states, and many others.

Diagnostic values are read-only.

**DIAGNOSTICS**  
**SPEED SP (Hz)**

The total **SPEED SP** (speed setpoint) is displayed in Hz.

**DIAGNOSTICS**  
**TORQUE MODE**

**TORQUE MODE** indicates whether the drive has been configured for **CONST TORQUE** (constant torque) or **FAN/PUMP TORQUE** (fan and pump) applications.

Note:- **TORQUE MODE** is a diagnostic and is for customer information only. The configuration of the drive cannot be altered by the user. The configuration is set up in the factory prior to shipment. **FAN/PUMP TORQUE** drives have the same full load current ratings as the equivalent **CONST TORQUE** drives but have a reduced overload capacity. A **FAN/PUMP TORQUE** drive is capable of providing 120% overload for 30s, whereas a **CONST TORQUE** drive can provide 150% overload for 60s.

**DIAGNOSTICS**  
**PID ERROR**

The **PID ERROR** is displayed in % of the **LIMIT FREQUENCY** parameter.

Note:- The default value of the **LIMIT FREQUENCY** is 120Hz.

**DIAGNOSTICS**  
**PID CLAMPED**

**PID CLAMPED** indicates whether the output of the internal pid has saturated.

**DIAGNOSTICS**  
**PID OUTPUT**

The **PID OUTPUT** is output of the internal pid displayed in Hz.

**DIAGNOSTICS**  
**REMOTE SP (Hz)**

The **REMOTE SP** (remote setpoint) is displayed in Hz.

Note:- When the LOCAL/REMOTE digital input (terminal C27) is connected to +24V (terminal B18), the total speed setpoint becomes equal to the remote setpoint.

**DIAGNOSTICS**  
**LOCAL SP (Hz)**

The **LOCAL SP** (local setpoint) is displayed in Hz.

Note:- When the **LOCAL/REMOTE** digital input (terminal C27) is connected to 0V (terminal C19), the total speed setpoint becomes equal to the local setpoint.

**DIAGNOSTICS**  
**SPEED FB (RPM)**

The **SPEED FB** (speed feedback) is displayed in rpm.

Note:- In order for this diagnostic to operate correctly, the drive has to be connected to an encoder via the speed feedback option card. The speed feedback has to be enabled and the correct number of encoder lines has to be entered in the **SETUP PARAMETERS** menu. Information concerning the number of motor pole-pairs also has to be correctly entered.

**DIAGNOSTICS**  
**SPEED FB (Hz)**

The **SPEED FB** (speed feedback) is displayed in Hz.

Note:- In order for this diagnostic to operate correctly, the drive has to be connected to an encoder via the speed feedback option card. The speed feedback has to be enabled and the correct number of encoder lines has to be entered in the **SETUP PARAMETERS** menu. Information concerning the number of motor pole-pairs also has to be correctly entered.

**DIAGNOSTICS**  
**SPEED SP (RPM)**

The total **SPEED SP** (speed setpoint) is displayed in rpm.

Note:- In order for this diagnostic to operate correctly, information concerning the number of motor pole-pairs also has to be correctly entered in the **SETUP PARAMETERS** menu.

## CHAPTER 2 - Issue 3 Software New or Renamed Parameters

### WARNING



If your application requires operation above 120Hz with a special high speed motor then the **LIMIT FREQUENCY** parameter should be adjusted before any other parameters are changed. This is because **LIMIT FREQUENCY** affects the scaling of all frequency related parameters. The default value for **LIMIT FREQUENCY** is 120Hz which covers the majority of applications for standard induction motors.

### SETUP PARAMETERS RAMPS

Two new ramp related parameters have been added. These are **RAMP TYPE**, which selects the ramp characteristic and **S RAMP %**, which governs the degree of curvature on parabolic and s-ramps.

#### RAMPS RAMP TYPE

Range: LINEAR RAMP , PARABOLIC RAMP or S RAMP  
Default: LINEAR RAMP

**RAMP TYPE**, allows the user to choose between three types of ramp characteristics, LINEAR RAMP, PARABOLIC RAMP or S RAMP.

The LINEAR RAMP characteristic provides a linear increase in motor speed with time. The PARABOLIC RAMP provides a soft start characteristic, while the S RAMP provides both soft start at the beginning of the response, and soft finish at the end.

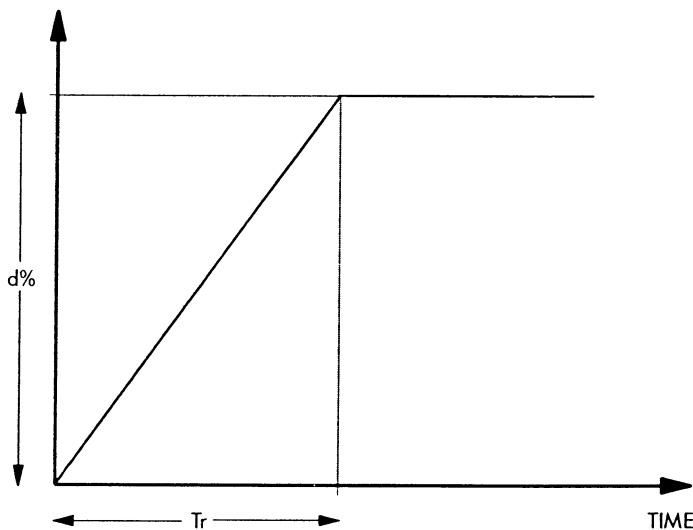
#### RAMPS S RAMP %

Range: 0 to 100%  
Default: 100%

**S RAMP %**, dictates the degree of soft start and soft finish experienced when using the PARABOLIC RAMP or S RAMP. **S RAMP %** has no effect when using LINEAR RAMP. An **S RAMP %** value of 0% causes the PARABOLIC RAMP or S RAMP to act as a LINEAR RAMP.

Note:- When using PARABOLIC RAMP or S RAMP, the time taken for the motor speed to reach the speed setpoint will be dependent on the ramp time, the size of the speed setpoint and the value of the **S RAMP %** parameter.

#### LINEAR RAMP:

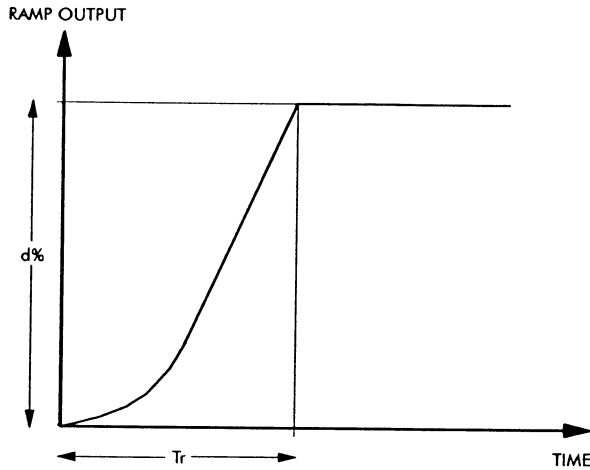


The LINEAR RAMP response time,  $T_r$ , for a given setpoint step size,  $d\%$ , can be calculated as follows:

$$T_r = \text{RAMPTIME} \times \frac{d\%}{100\%}$$

Note:- 100% is assumed to be equal to the **LIMIT FREQUENCY**.

PARABOLIC RAMP:



The PARABOLIC RAMP response time for a given setpoint step size,  $d\%$ , and **S RAMP %** can be calculated as follows:

$$\text{If } \sqrt{2 \times \frac{d\%}{100\%} \times \frac{SRAMP\%}{200\% - SRAMP\%}} \leq \frac{SRAMP\%}{200\% - SRAMP\%}$$

Then the PARABOLIC RAMP contains pure acceleration only. Thus, the response time,  $Tr$ , can be calculated using:

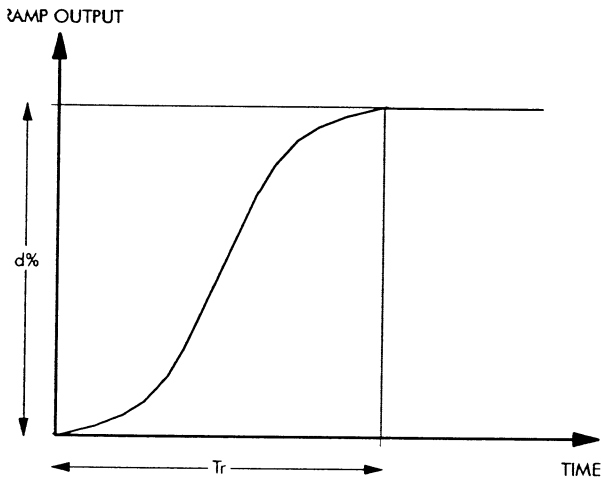
$$Tr = RAMPTIME \times \sqrt{2 \times \frac{d\%}{100\%} \times \frac{SRAMP\%}{200\% - SRAMP\%}}$$

Else, the PARABOLIC RAMP contains acceleration and linear sections to its response. Thus, the response time,  $Tr$ , can be calculated using:

$$Tr = RAMPTIME \times \left[ \frac{d\%}{100\%} + \frac{1}{2} \times \frac{SRAMP\%}{200\% - SRAMP\%} \right]$$

Note:- 100% is assumed to be equal to the **LIMIT FREQUENCY**.

S RAMP:



The S RAMP response time for a given setpoint step size,  $d\%$ , and **S RAMP %** can be calculated as follows:

$$\text{If } \sqrt{\frac{d\%}{100\%} \times \frac{SRAMP\%}{200\% - SRAMP\%}} \leq \frac{SRAMP\%}{200\% - SRAMP\%}$$

Then the S RAMP contains pure acceleration and deceleration only. Thus, the response time,  $Tr$ , can be calculated using:

$$Tr = RAMPTIME \times 2 \times \sqrt{\frac{d\%}{100\%} \times \frac{SRAMP\%}{200\% - SRAMP\%}}$$

Else, the S RAMP contains acceleration, linear and deceleration sections to its response. Thus, the response time,  $Tr$ , can be calculated using:

$$Tr = RAMPTIME \times \frac{d\%}{100\%} \times \frac{200\%}{200\% - SRAMP\%}$$

Note:- 100% is assumed to be equal to the **LIMIT FREQUENCY**.



**SETUP PARAMETERS**  
**VOLTAGE BOOST**

**VOLTAGE BOOST** is used to correctly flux the motor at low speed. This allows the drive to produce greater starting torque for friction loads. The **VOLTAGE BOOST** parameter increases the motor volts above the selected V/F characteristic at the lower end of the speed range.

**VOLTAGE BOOST**  
**FIXED BOOST**

Range: 0 to 25% of rated output volts  
Default: 0%

The **FIXED BOOST** parameter determines the level of extra volts applied to the motor at low speeds.

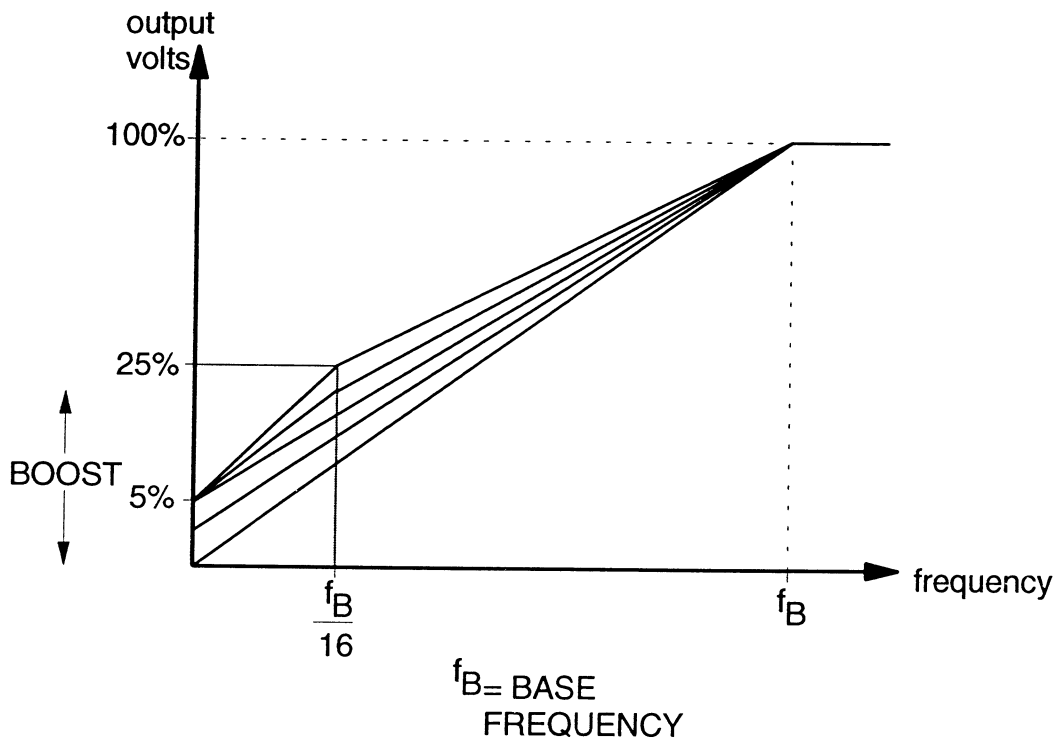
**VOLTAGE BOOST**  
**AUTO BOOST**

Range: ENABLED or DISABLED  
Default: DISABLED

The **AUTO BOOST** parameter determines whether the applied voltage boost is a fixed value or varies lineary with motor load. With the **AUTO BOOST** parameter ENABLED, the applied boost is 0% at no load, but equal to the **FIXED BOOST** parameter at 100% load. **AUTO BOOST** is especially suited to situation loads where high motor torque is initially required for starting, with the required torque falling rapidly thereafter.

Note:- 
$$BOOSTLEVEL = FIXEDBOOST \times \frac{MEASUREDLOAD}{100\%}$$

The **AUTO BOOST** feature requires a value of **FIXED BOOST** to be set by the user. Zero **FIXED BOOST** will result in zero **AUTO BOOST**.



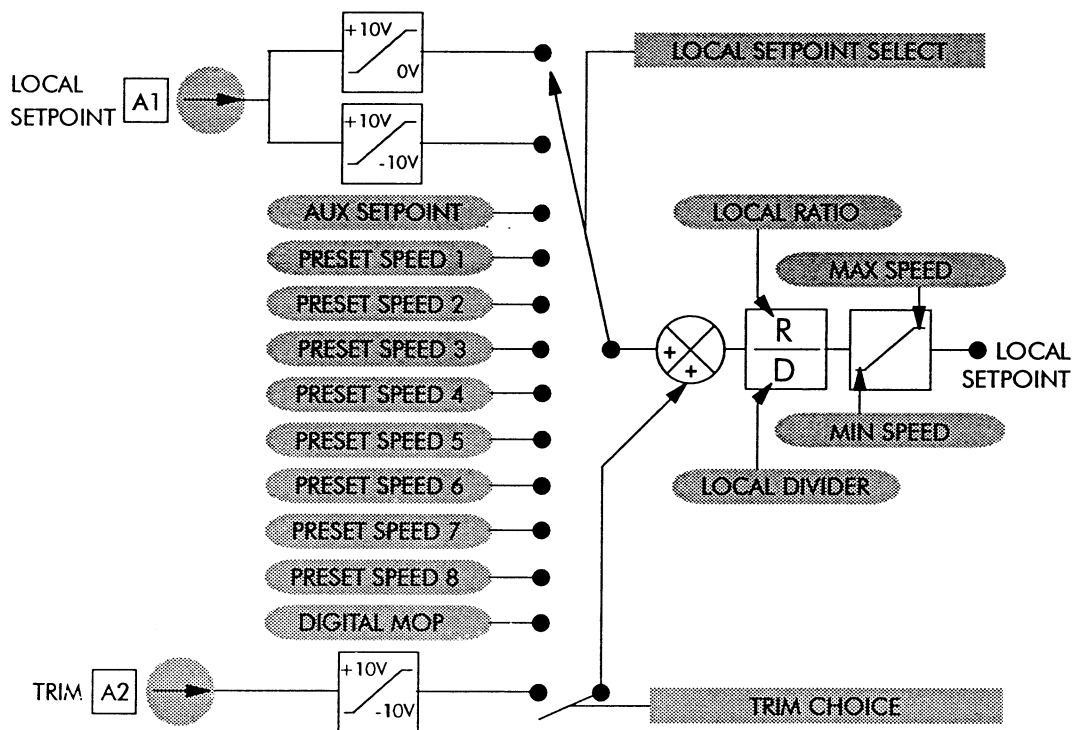
## SETUP PARAMETERS SETPOINT SELECT

This menu allows the user to configure the local and remote setpoints. The LOCAL/REMOTE digital input (terminal C27) can be used to switch between local and remote setpoints.

### SETPOINT SELECT LOCAL SETPOINT

There are 12 possible sources for the **LOCAL SETPOINT**:

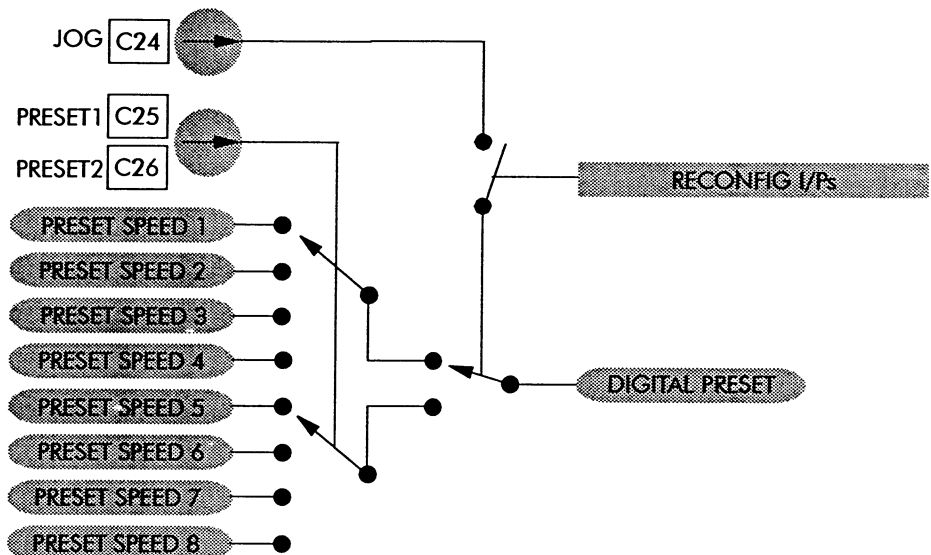
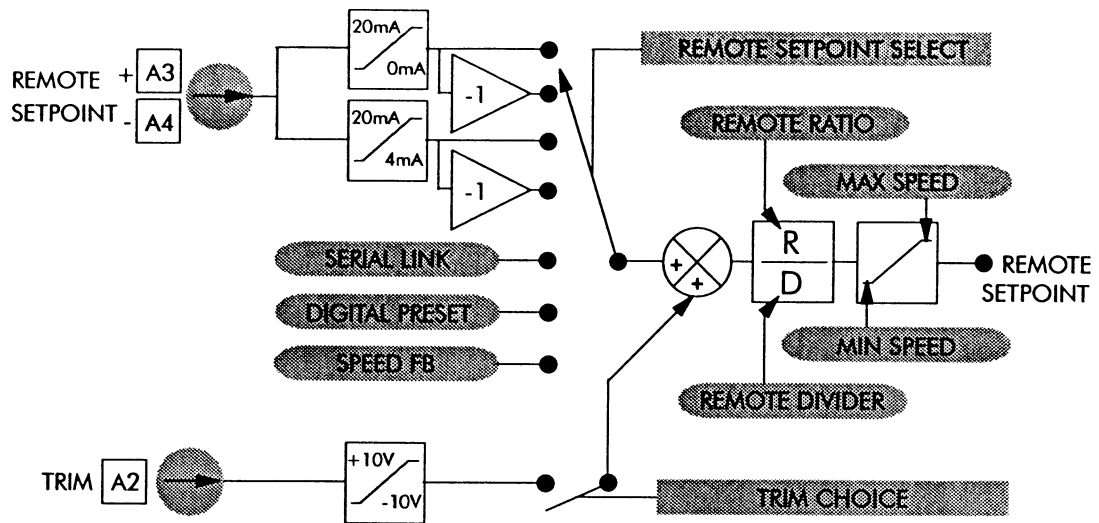
1. analogue input terminals A1, 0V TO +10V
2. analogue input terminals A1, -10V TO +10V
3. **AUX SETPOINT** parameter
4. **PRESET SPEED 1** parameter
5. **PRESET SPEED 2** parameter
6. **PRESET SPEED 3** parameter
7. **PRESET SPEED 4** parameter
8. **PRESET SPEED 5** parameter
9. **PRESET SPEED 6** parameter
10. **PRESET SPEED 7** parameter
11. **PRESET SPEED 8** parameter
12. **DIGITAL MOP** parameter



### SETPOINT SELECT REMOTE SETPOINT

There are 7 possible sources for the **REMOTE SETPOINT**:

1. analogue input terminals A3/A4, I LOOP 0-20mA
2. analogue input terminals A3/A4, I LOOP 20-0mA
3. analogue input terminals A3/A4, I LOOP 4-20mA
4. analogue input terminals A3/A4, I LOOP 20-4mA
5. **SERIAL LINK**, serial link setpoint parameter
6. **DIGITAL PRESET**, preset speed selected by digital inputs
7. **SPEED FEEDBACK**, measured speed as setpoint



**SETPOINT SELECT  
TRIM CHOICE**

Range: LOCAL & REMOTE , LOCAL ONLY or REMOTE ONLY  
Default: LOCAL & REMOTE

The bipolar, -10V to +10V, speed trim terminal, A2, can now be selected to operate with local setpoints only, or with remote setpoints only, or with local and remote setpoints simultaneously.

**SETUP PARAMETERS  
SETPOINT SCALE**

New setpoint ratio functions have been provided for both local and remote setpoints. The sum of the setpoint and trim can now be scaled by a **RATIO** and a **DIVIDER** before being clamped between **MIN SPEED** and **MAX SPEED**.

**SETPOINT SCALE  
LOCAL RATIO**

Range: -3.0000 to +3.0000  
Default: 1.0000

**SETPOINT SCALE  
LOCAL DIVIDER**

Range: -3.0000 to +3.0000  
Default: 1.0000

**SETPOINT SCALE  
REMOTE RATIO**

Range: -3.0000 to +3.0000  
Default: 1.0000

**SETPOINT SCALE  
REMOTE DIVIDER**

Range: -3.0000 to +3.0000  
Default: 1.0000

**SETUP PARAMETERS  
JOG SPEED**

Range: -LIMIT FREQUENCY to +LIMIT FREQUENCY  
Default: 5.0Hz

The **JOG SPEED** parameter determines the speed that the drive will run at when the JOG terminal, C24, is raised to +24V (terminal B18).

Note:- The JOG terminal, C24, has priority over the RUN terminal, C20.

Note:- The **JOG SPEED** parameter can only be altered when the **RECONFIG I/Ps** parameter in the **SYSTEM** menu is set to 4 PRESETS & JOG.

**SETUP PARAMETERS  
DIGITAL MOP**

The **DIGITAL MOP** provides the feature of an internal motorised potentiometer setpoint (a raise/lower function). In order for the **DIGITAL MOP** to operate, the **RECONFIG I/Ps** parameter in the **SYSTEM** menu must be set to **DIGITAL MOP & PRESET**. Once configured, terminal PRESET 1, C25, acts as setpoint RAISE, while terminal PRESET 2, C26, acts as setpoint LOWER. The JOG terminal, C24, is reconfigured to provide an mop preset command.

Note:- The **DIGITAL MOP** will not operate when the **RAMP TYPE** parameter is selecting S RAMP.

**DIGITAL MOP  
MAX MOP SPEED**

Range: -LIMIT FREQUENCY to +LIMIT FREQUENCY  
Default: LIMIT FREQUENCY

The **MAX MOP SPEED** parameter is the target **DIGITAL MOP** speed setpoint while RAISE is active.

**DIGITAL MOP  
MIN MOP SPEED**

Range: -LIMIT FREQUENCY to +LIMIT FREQUENCY  
Default: 0Hz

The **MIN MOP SPEED** parameter is the target **DIGITAL MOP** speed setpoint while LOWER is active.

**DIGITAL MOP  
MOP PRESET SPEED**

Range: -LIMIT FREQUENCY to +LIMIT FREQUENCY  
Default: 0Hz

The **MOP PRESET SPEED** parameter contains the **DIGITAL MOP** preset speed setpoint.

**SETUP PARAMETERS  
PRESET SPEEDS**

4 new preset speeds are now available to the user. This second bank of presets is only active when the **RECONFIG I/Ps** parameter in the **SYSTEM** menu is set to 8 PRESETS. Once the values have been programmed, this second bank of presets can be selected remotely via the two digital inputs C25 and C26, while the JOG terminal, C24, is held at +24V (terminal B18). The first bank of presets (preset speeds 1 to 4) can still be selected remotely using terminals C25 and C26, while the JOG terminal, C24, is held at 0V (terminal C19).

**PRESET SPEEDS  
PRESET SPEED 5**

Range: -LIMIT FREQUENCY to +LIMIT FREQUENCY  
Default: 0Hz

**PRESET SPEEDS  
PRESET SPEED 6**

Range: -LIMIT FREQUENCY to +LIMIT FREQUENCY  
Default: 0Hz

**PRESET SPEEDS**  
**PRESET SPEED 7**

Range: -LIMIT FREQUENCY to +LIMIT FREQUENCY  
Default: 0Hz

**PRESET SPEEDS**  
**PRESET SPEED 8**

Range: -LIMIT FREQUENCY to +LIMIT FREQUENCY  
Default: 0Hz

**SETUP PARAMETERS**  
**SPEED FEEDBACK**

The **SPEED FEEDBACK** parameters are used to calibrate the speed feedback measurement. The encoder option card needs to be fitted to the drive and connected to a suitable encoder before the speed feedback measurement will operate correctly.

**SPEED FEEDBACK**  
**FEEDBACK SOURCE**

Range: NONE or ENCODER  
Default: NONE

**FEEDBACK SOURCE** acts to enable the speed measurement function from an encoder.

**SPEED FEEDBACK**  
**ENCODER SIGN**

Range: POSITIVE or NEGATIVE  
Default: POSITIVE

**ENCODER SIGN** can be used to invert the sign of the measured speed where necessary.

**SPEED FEEDBACK**  
**ENCODER LINES**

Range: 1 to 10000  
Default: 1000

The **ENCODER LINES** resolution must be set correctly to match the type of encoder being used. Incorrect setting of this parameter will result in an erroneous speed measurement.

**SPEED FEEDBACK**  
**POLE PAIRS**

Range: 1 to 4  
Default: 2

The **POLE PAIRS** parameters must correspond to the number of pole-pairs for the A.C. motor being used. The most common form of A.C. motor has 4 poles or 2 pole-pairs. If you are in doubt as to the correct number of pole-pairs your motor possesses, please contact your motor supplier. Incorrect setting of this parameter will result in an erroneous speed measurement.

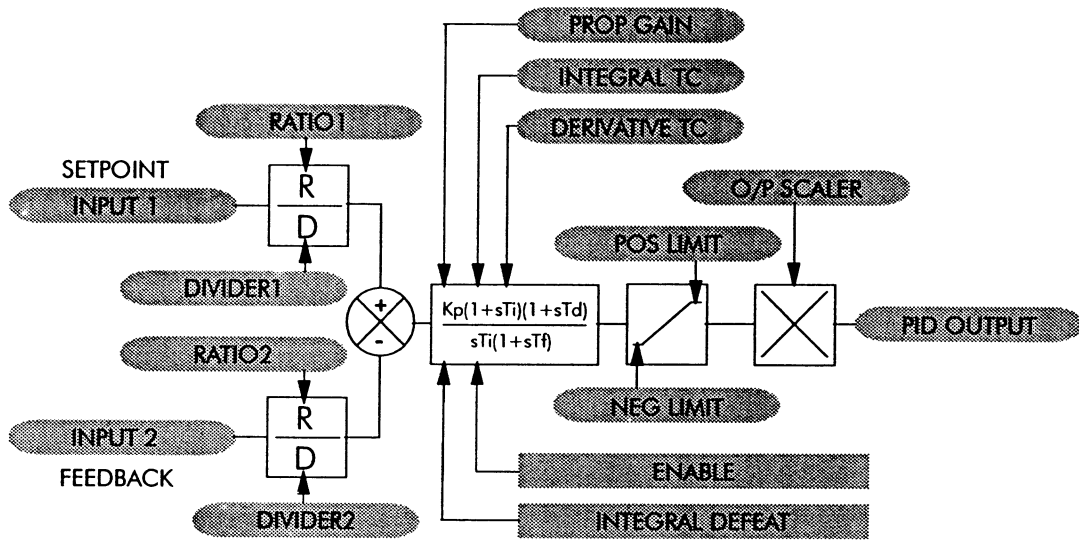
Note:- The motor synchronous speed can be calculated from the motor supply frequency and the pole-pairs using the following :

$$N_{sync}(rpm) = 60 \times \frac{Freq(Hz)}{pole - pairs}$$

eg. a 4 pole motor (2 pole-pairs) with a base speed of 50Hz will have a synchronous speed of 1500rpm.

**SETUP PARAMETERS  
PID**

Issue 3 software provides the user with a general purpose PID controller block internal to the drive. The PID can be used either in conjunction with speed feedback to provided closed-loop speed control, or with other external setpoints and feedbacks for closed-loop process control.



**PID  
PROP GAIN**

Range: 0.0 to 100.0  
Default: 1.0

The **PROP GAIN** parameter is the true proportional gain of the PID controller. With a **PROP GAIN** of zero, the PID output would become zero.

**PID  
INTEGRAL TC**

Range: 0.01 to 100.00s  
Default: 1.00s

The **INTEGRAL TC** parameter is the integral time constant of the PID controller.

**PID  
DERIVATIVE TC**

Range: 0.000 to 10.000s  
Default: 0.000s

The **DERIVATIVE TC** parameter is the derivative time constant of the PID controller. With the **DERIVATIVE TC** set to zero, the PID becomes a P+I controller.

**PID  
FILTER TC**

Range: 0.000 to 10.000s  
Default: 2.000s

In order to help attenuate high frequency noise on the PID output, a first order lag output filter has been provided. The **FILTER TC** parameter determines the output filter time constant.

**PID  
POSITIVE LIMIT**

Range: 0.00 to 105.00%  
Default: 100.00%

The **POSITIVE LIMIT** parameter determines the maximum positive excursion of the PID output. 100% PID output corresponds to the **LIMIT FREQUENCY**.

**PID  
NEGATIVE LIMIT**

Range: -105.00 to 0.00%  
Default: -100.00%

The **NEGATIVE LIMIT** parameter determines the maximum negative excursion of the PID output. 100% PID output corresponds to the **LIMIT FREQUENCY**.

<b>PID O/P SCALER (TRIM)</b>	Range: -3.0000 to +3.0000 Default: 0.0417
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The **O/P SCALER (TRIM)** parameter represents an overall PID output scaling function which is applied after the **PID POSITIVE LIMIT** and **NEGATIVE LIMIT** clamps.

Note:- With 100% **POSITIVE LIMIT** and **NEGATIVE LIMIT** clamps, the default **O/P SCALER (TRIM)** value of 0.0417, represents a maximum PID output of 5Hz with a 120Hz **LIMIT FREQUENCY**.

<b>PID ENABLE</b>	Range: ENABLED or DISABLED Default: DISABLED
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The **ENABLE** parameter globally resets the PID output and integral term when **DISABLED**.

<b>PID INTEGRAL DEFEAT</b>	Range: ON or OFF Default: OFF
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The **INTEGRAL DEFEAT** parameter resets the PID integral term when **ON**.

<b>PID INPUT 1</b>	Range: -300.00 to +300.00% Default: 0.00%
------------------------	--

The **INPUT 1** parameter represents the value of the PID setpoint. 100% corresponds to the value of the **LIMIT FREQUENCY**.

<b>PID RATIO 1</b>	Range: -3.0000 to +3.0000 Default: 1.0000
------------------------	--

The **RATIO 1** represents the PID setpoint ratio parameter.

<b>PID DIVIDER 1</b>	Range: -3.0000 to +3.0000 Default: 1.0000
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The **DIVIDER 1** represents the PID setpoint divider parameter.

<b>PID INPUT 2</b>	Range: -300.00 to +300.00% Default: 0.00%
------------------------	--

The **INPUT 2** parameter represents the value of the PID feedback. 100% corresponds to the value of the **LIMIT FREQUENCY**.

<b>PID RATIO 2</b>	Range: -3.0000 to +3.0000 Default: 1.0000
------------------------	--

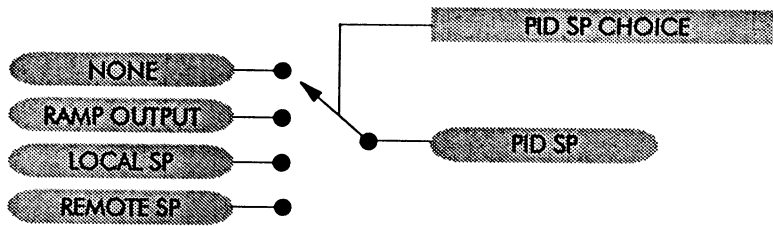
The **RATIO 2** represents the PID feedback ratio parameter.

<b>PID DIVIDER 2</b>	Range: -3.0000 to +3.0000 Default: 1.0000
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The **DIVIDER 2** represents the PID feedback divider parameter.

<b>PID PID SP CHOICE</b>	Range: NONE , RAMP OUTPUT , LOCAL SETPOINT or REMOTE SETPOINT Default: NONE
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The **PID SP CHOICE** parameter determines the source of the PID setpoint.

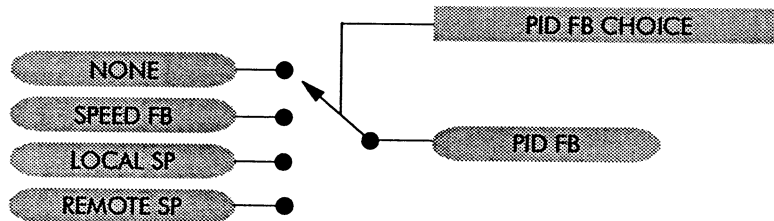


**PID**  
**PID FB CHOICE**

Range: NONE , SPEED FEEDBACK , LOCAL SETPOINT or REMOTE SETPOINT

Default: NONE

The **PID FB CHOICE** parameter determines the source of the PID feedback.



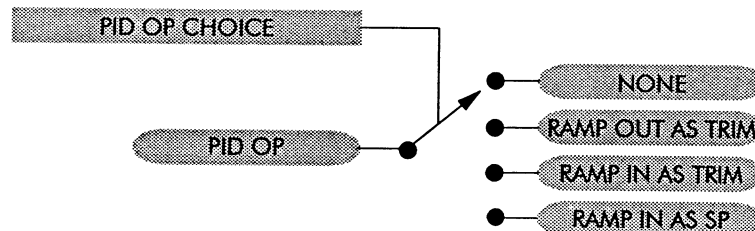
**PID**  
**PID OP**

**PID OP**  
**PID OP CHOICE**

Range: NONE, RAMP OUT AS TRIM, RAMP IN AS TRIM or RAMP IN AS SP

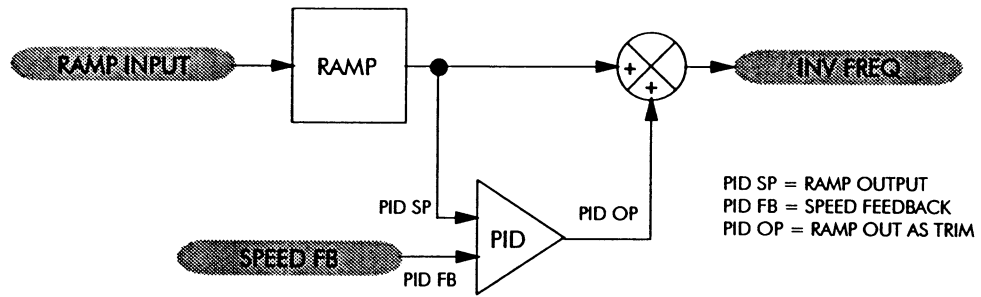
Default: NONE

The **PID OP CHOICE** parameter determines the application of the PID output.



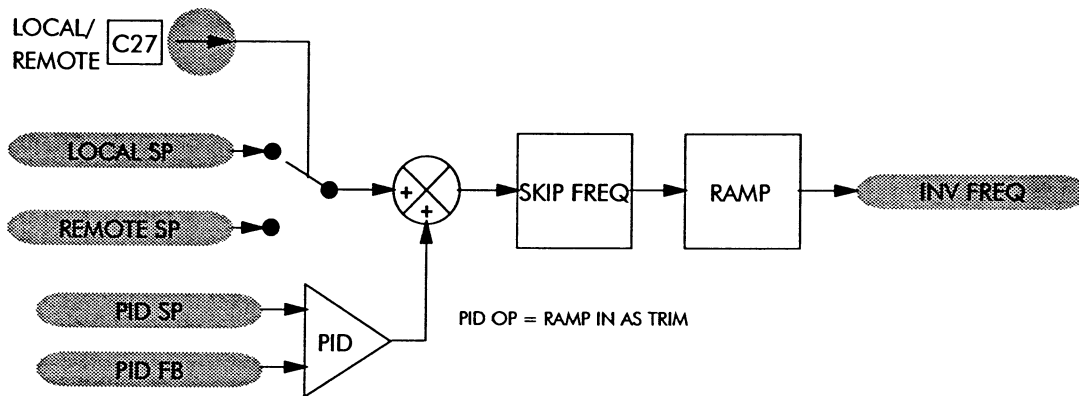
For closed-loop speed control, **PID OP CHOICE**, should be set to RAMP OUT AS TRIM and **O/P SCALER (TRIM)** should be chosen such that maximum PID output corresponds to full load motor slip frequency. In this way, the ramp output can be trimmed by the PID to compensate for motor speed variations due to load.



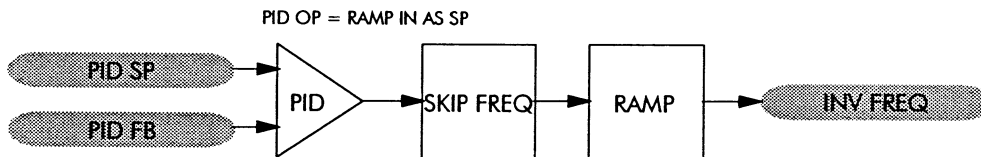


PID IN CLOSED-LOOP SPEED CONTROL APPLICATION

For closed-loop process control applications, **PID OP CHOICE**, can be set either such that the PID output trims the ramp input, RAMP IN AS TRIM, or so that the PID output acts as the ramp input, RAMP IN AS SP.



PID IN CLOSED-LOOP PROCESS CONTROL APPLICATION



PID IN CLOSED-LOOP PROCESS CONTROL APPLICATION

<b>PID OP</b>
<b>PID OP MODE</b>

Range: UNIPOLAR or BIPOLAR  
 Default: UNIPOLAR

The **PID OP MODE** parameter determines the type of control the PID is allowed to exhibit for closed-loop process control applications (**PID OP CHOICE** set to either RAMP IN AS TRIM or RAMP IN AS SP). In UNIPOLAR mode, the PID output cannot cause the inverter output frequency to be of an opposite sign to the setpoint. In BIPOLAR mode, the PID output is allowed to cause the inverter output frequency to an opposite direction to the setpoint.

Note:- In closed-loop speed control with **PID OP CHOICE** set to RAMP OUT AS TRIM, the PID is never allowed to drag the inverter output frequency to an opposite direction to the setpoint.

## SETUP PARAMETERS AUTO RESTART

The **AUTO RESTART** function allows the drive a limited number of self restarts after a trip has occurred. **AUTO RESTART** is only recommended for remote drive applications where manual clearing of drive fault conditions is impractical.

### WARNING



When using **AUTO RESTART** the drive will restart automatically. It is the users responsibility to ensure that unexpected drive restarts do not cause injury to people or damage to equipment.

#### AUTO RESTART ENABLE

Range: ENABLED or DISABLED  
Default: DISABLED

The **ENABLE** parameter globally enables the **AUTO RESTART** function.

#### AUTO RESTART ATTEMPT DELAY

Range: 0.5 to 600.0s  
Default: 10.0s

**ATTEMPT DELAY** determines the delay between **AUTO RESTART** attempts.

#### AUTO RESTART ATTEMPTS

Range: 1 to 10  
Default: 5

The **ATTEMPTS** parameter governs the number of restarts the drive will try before requiring a manual fault reset.

#### AUTO RESTART ATTEMPTS LEFT

Range: 10 to 1

**ATTEMPTS LEFT** is a read-only diagnostic indicating the number of restart attempts left before a manual fault reset is required.

#### AUTO RESTART TRIP MASK

Range: 0x0000 to 0xFFFF  
Default: 0x1F00

The **TRIP MASK** parameter permits the user to **AUTO RESTART** only on selected trip conditions. The **TRIP MASK** is a 16 bit hexadecimal number each bit of which is logically ANDed with the corresponding bit of the 16 bit **DRIVE STATUS** diagnostic word. When the drive trips, a unique bit in the **DRIVE STATUS** diagnostic word is set. This bit identifies the type of trip that has occurred. If the corresponding bit in the **TRIP MASK** word is also set, and **AUTO RESTART** is **ENABLED**, an **AUTO RESTART** attempt will be made. If the corresponding bit in the **TRIP MASK** word is not set, no **AUTO RESTART** attempt is made (and the fault condition will require a manual reset).

Note:- The default value for the **TRIP MASK** word is 0x1F00. Thus, with the **AUTO RESTART** feature **ENABLED**, the drive will only attempt to restart after the following trips:

- DC Link Overvoltage Trip
- DC Link Undervoltage Trip
- Overcurrent Trip
- I\*T Trip
- Stall Trip

#### AUTO RESTART AR CANCEL TIME

Range: 0.1 to 600.0s  
Default: 300.0s

The **AR CANCEL TIME** sets the required period of drive operation after a successful **AUTO RESTART** before the **ATTEMPTS LEFT** diagnostic is reset to the **ATTEMPTS** parameter.

## SETUP PARAMETERS FLYCATCHING

The **FLYCATCHING** function enables the drive to be restarted smoothly into an spinning motor.

### FLYCATCHING ENABLE

Range: ENABLED or DISABLED  
Default: DISABLED

The **ENABLE** parameter globally enables the flycatching feature. With the feature **ENABLED**, when the drive is re-enabled from a stopped condition, the drive performs a speed search sequence. Once the motor speed has been identified, the drive begins to smoothly ramp to the speed setpoint from the discovered motor speed.

### FLYCATCHING SEARCH MODE

Range: UNIDIRECTIONAL, BIDIRECTIONAL or REFLUX AT SP  
Default: BIDIRECTIONAL

The **SEARCH MODE** parameter determines the type of speed search sequence performed by the drive when the flycatching mode is engaged. The **UNIDIRECTIONAL** speed search only searches for the motor speed in the direction of the speed setpoint. The **BIDIRECTIONAL** speed search, initially searches for the motor speed in the direction of the speed setpoint. If the drive fails to identify the motor speed in this direction, a second speed search is performed in the reverse direction. The **REFLUX AT SP** option simply performs a soft-start at the speed setpoint. This mode can be used in situations where the motor speed is known not to have deviated much from the speed setpoint. In situations where this is not the case, **UNIDIRECTIONAL** or **BIDIRECTIONAL** flycatching is preferred.

### FLYCATCHING REFLUX TIME

Range: 0.1s to 10.0s  
Default: 2.0s

The **REFLUX TIME** parameter determines the time taken to ramp up the inverter output volts from the **SEARCH VOLTS** level to the normal operating level once the motor speed has been successfully identified.

Note:- Refluxing the motor too quickly can cause the drive to trip on either overvoltage or overcurrent. In either case increasing this parameter will reduce the risk of tripping.

### FLYCATCHING SEARCH TIME

Range: 0.1s to 10.0s  
Default: 5.0s

The **SEARCH TIME** parameter governs the rate at which the flycatching speed search is performed. Once flycatching is initiated, the spinning motor is refluxed to the **SEARCH VOLTS** level with the inverter output frequency fixed at the **MAXIMUM SPEED** parameter. The inverter output frequency is then ramped down towards the **MIN SEARCH SPEED** level at a ramp rate governed by the **SEARCH TIME** parameter.

Note:- Performing the flycatching speed search too quickly can cause the drive to inaccurately identify the motor speed. Refluxing at an inaccurate motor speed can cause the drive to trip on overvoltage. If this occurs, increasing this parameter will reduce the risk of tripping.

### FLYCATCHING SEARCH VOLTS

Range: 0.0% to 100.0%  
Default: 15.0%

The **SEARCH VOLTS** parameter determines the percentage of the full motor volts applied during the flycatching speed search sequence.

Note:- Increasing the **SEARCH VOLTS** level improves the accuracy of the discovered motor speed but increases the braking influence of the speed search on the rotating motor.

### FLYCATCHING MIN SEARCH SPEED

Range: 0.0Hz to 120.0Hz  
Default: 10.0Hz

The **MIN SEARCH SPEED** parameter determines the lower limit of the **UNIDIRECTIONAL** and **BIDIRECTIONAL** speed search sequences. If the speed search falls below this level, flycatching is deemed to have failed. The drive will then restart from zero speed.

**SETUP PARAMETERS  
MENU POSITION**

Range: MICRO AC DRIVE  
SPEED SP (Hz)  
DRIVE FREQUENCY  
MOTOR CURRENT  
MOTOR LOAD  
EXT TORQUE LIMIT  
DRIVE STATUS  
DIGITAL INPUTS  
TORQUE MODE  
PID ERROR  
PID CLAMPED  
PID OUTPUT  
SPEED FB (RPM)  
SPEED FB (Hz)  
SPEED SP (RPM)  
LOCAL SP (Hz)  
REMOTE SP (Hz)

Default: MICRO AC DRIVE

This parameter selects a diagnostic menu to be displayed on power-up.

**SETUP PARAMETERS  
RECONFIG O/Ps**

The **RECONFIG O/Ps** menu contains parameters that govern the operation of the reconfigurable relay outputs RELAY1 and RELAY2.

**RECONFIG O/Ps  
AT SPEED THRESH**

Range: 0 to +LIMIT FREQUENCY  
Default: LIMIT FREQUENCY/120

**AT SPEED THRESH** determines a frequency band around the drive speed setpoint. when the inverter output frequency enters into this frequency band, the AT SPEED relay will operate (change state).

**RECONFIG O/Ps  
0 SPEED THRESH**

Range: 0 to +LIMIT FREQUENCY  
Default: LIMIT FREQUENCY/120

**0 SPEED THRESH** determines the inverter output frequency at which the ZERO SPEED relay will operate (change state).

**RECONFIG O/Ps  
LOAD THRESH**

Range: 0 to 150%  
Default: 50%

**LOAD THRESH** determines the measured motor load at which the AT LOAD relay will operate (change state).

**RECONFIG O/Ps  
FB SPEED THRESH**

Range: 0 to +LIMIT FREQUENCY  
Default: LIMIT FREQUENCY/12

**FB SPEED THRESH** determines the measured motor speed at which the AT FB SPEED relay will operate (change state).

**SETUP PARAMETERS  
RAMP OUTPUT**

Range: MIN TO MAX , 0 TO LIMIT FREQ or 0 TO MAX  
Default: MIN TO MAX

This parameter determines the scaling of the RAMP OUTPUT analogue output terminal A7.

MIN TO MAX gives 0V at **MIN SPEED** and +10V at **MAX SPEED**.

0 TO LIMIT FREQ gives 0V at 0Hz and +10V at the **LIMIT FREQUENCY**.

0 TO MAX gives 0V at 0Hz and +10V at **MAX SPEED**.

## CHAPTER 3 - Systems Menu

### SYSTEM RECONFIG O/PS

This menu controls the function of the two user-configurable relay outputs, RELAY 1, and RELAY 2.

#### RECONFIG O/PS RELAY 1

Range: ZERO SPEED  
AT SPEED  
RUN CONFIRM  
BRAKE CONTROL  
AT LOAD  
AT FB SPEED

Default: ZERO SPEED

#### RECONFIG O/PS RELAY 2

Range: ZERO SPEED  
AT SPEED  
RUN CONFIRM  
BRAKE CONTROL  
AT LOAD  
AT FB SPEED

Default: AT SPEED

Each relay can be configured to 1 of 6 functions as described below:

#### ZERO SPEED

The relay contacts close when the drive output frequency is within the  $\pm 0$  **SPEED THRESH** parameter of 0Hz.. The relay contacts subsequently open when the drive output frequency rises out of the  $\pm 0$  **SPEED THRESH** parameter - frequency Band.

#### AT SPEED

The relay contacts close when the drive output frequency falls within the speed setpoint  $\pm$  the **AT SPEED THRESH** parameter.

The relay contacts subsequently open when the drive output frequency differs from the speed setpoint by more than  $\pm$  the **AT SPEED THRESH** parameter.

#### RUN CONFIRM

Relay contacts are closed when the drive is running.

Relay contacts are open when the drive is not running.

#### WARNING



The **BRAKE CONTROL** logic will fail to operate correctly where there is a missing motor phase. In this situation the drive will incorrectly estimate the motor load. As a consequence the brake logic will release the motor brake while the motor is not producing torque. In this situation the motor has no control over the load. It is the responsibility of the user, by the use of ancillary equipment, to detect missing motor phases and to prevent the **BRAKE CONTROL** logic from either releasing or maintaining open the motor brake in these circumstances.

#### BRAKE CONTROL

This mode is intended to control electro-mechanical brakes in lift and hoist applications. There are 3 parameters associated with this mode. These are under the **BRAKE CONTROL** parameter described in the setup parameters section.

Relay contacts close when drive frequency  $>$  **ON FREQ LEVEL** AND motor load  $>$  **ON LOAD LEVEL**

Relay contacts open when drive frequency  $<$  **OFF FREQ LEVEL**.

### AT LOAD

The relay contacts close when the measured motor load exceeds the **LOAD THRESH** parameter.  
The relay contacts will open when the measured motor load falls below the **LOAD THRESH** parameter.

### AT FB SPEED

The relay contacts will close when the measured motor speed is greater than the **FB SPEED THRESH** parameter.  
The relay contacts close when the measured motor speed is below the **FB SPEED THRESH** parameter.

Note:- For the **AT FB SPEED** relay to operate correctly the drive requires speed feedback information from an encoder via the speed feedback option board. In addition the data concerning the number of encoder lines and motor pole-pairs needs to have been correctly entered in the set up parameters menu.

<b>SYSTEM RECONFIG I/Ps</b>
---------------------------------

Range: 4 PRESETS & JOG  
8 PRESETS  
DIGITAL MOP & PRESET

Default: 4 PRESETS & JOG

This parameter determines the functionality of the JOG, PRESET1 & PRESET2 control terminals (terminals C24, C25 & C26 respectively).

With 4 PRESETS & JOG selected, raising the JOG terminal to +24V causes the drive to run at the jog speed setpoint. The digital inputs PRESET1 & PRESET2 remotely select 1 of 4 preset speed setpoints.

With 8 PRESETS selected, the JOG digital input is now re-configured to select a second bank of preset speed (preset speeds 5 to 8).

With DIGITAL MOP & PRESET selected, the functionality of the JOG, PRESET1 & PRESET 2 terminals is again reconfigured to act as a digital motorised potentiometer. PRESET1 becomes RAISE, PRESET 2 becomes LOWER and JOG becomes MOP PRESET.

# CHAPTER 4 - SERIAL LINK MNEMONICS AND PARAMETER NUMBER ALLOCATION

## 4.1 INTRODUCTION

This function of this process is to interface between the users serial links and the drive's internal parameters and diagnostic variables.

There are two serial links, namely the primary RS422 serial link via an option board, and the auxiliary RS232 serial link.

## 4.2 SOFTWARE SPECIFICATION

Both the primary and auxiliary serial links comply broadly with the Eurotherm Communications protocol for both ASCII and BINARY modes.

### 4.2.1 ASCII

In ASCII mode, communications are supported as defined in table 1.

Communications Mode	Supported	Section in ref 1
Single Parameter Poll	Yes	5.5.2
Multi-Block Poll	No	5.5.3
Enquiry Poll	No	5.5.4
Selection	Yes	5.5.5
Multi-block selection	No	5.5.6
Fast Poll	Yes	5.6.1
Fast Selection	Yes	5.6.2

Table 1 Functionality in ASCII mode.

In ASCII mode the prime set of parameters is supported as defined in chapter 4.2.2. The instrument-specific mnemonics are defined in section 4.2.0.

The serial links operate in ASCII mode at the following baud rates: 9600 (default), 4800, 2400, 1200, 600 and 300.

### 4.2.2. Prime Set Parameters

The six prime set parameters return values as in table 2. They are all format 23 parameters. In ASCII mode the prime set of parameters is supported as defined in section

Mnemonic	Description	Access	Function
BL	Buffer length	R/O	Returns 4646 <sub>16</sub> indicating that both transmit and receive buffers are 46 <sub>16</sub> bytes long.
CI	Configuration Information	R/O	Returns 4CCC <sub>16</sub> indicating that the drive supports both fixed and variable length data formats, and that the drive is a single-function device.
EE	Error report	R/W	Returns one of the following to indicate the status of serial link transmissions : 00C0 No errors 01C7 Unknown mnemonic 02C2 Block check character fail 03C1 Parity error on received data 03C2 Framing or overrun error 05C8 Attempt to write to a read-only mnemonic 07C7 Invalid message format 08C8 Value in selection message out of range Writing any value to mnemonic EE resets it to 00C0.
II	Instrument Identifier	R/O	Returns 5840 <sub>16</sub> .
MN	Mode Number	R/O	Returns a fixed value 08C1 (the full Eurotherm standard is not supported).
VO	Version Number	R/O	Returns the issue number in the upper two characters, and the release number in the lower two characters. For example issue 2.4 returns 0204.

Table 2. ASCII prime set parameters

### 4.2.3 Binary

In binary mode, communications are supported as defined in table 3.

Communications Mode	Supported	Section in ref 1
Single Parameter Poll	Yes	6.2
Multi-Parameter Poll	Yes	6.3
Enquiry Poll	Yes	6.4
Selection	Yes	6.5

Table 3. Functionality in binary mode.

The serial link operates in binary mode at the following baud rates: 9600 (default), 4800, 2400, 1200, 600 and 300.

In binary mode, PNO 0 to 7 are not instrument-specific; and are detailed below. The data format consists of an integer part only, and no decimal part. The instrument-specific PNOs occupy the range 8 to 55, and are detailed in chapter 4.2.4. The 584 supports floating point numbers (refer to section 6.1.3c in reference 1).



## Block 0:

PNO	Access	Description									
0	R/O	Instrument Identifier. Same as ASCII mnemonic II.									
1	R/W	Error report. Same as ASCII mnemonic EE									
2		Reserved									
3		Reserved									
4	R/W	Changeband. In an enquiry poll or pseudo-enquiry poll R/W (see PNO 7), a value must have changed by an amount equal to or greater than the hysteresis before it will be reported. Hysteresis is measured in the smallest units applicable to each parameter. For example, if hysteresis = 10, then a parameter with one decimal point must change by 1.0, and a parameter with two decimal points must change by 0.10 before they will be reported									
5	R/O	Serial link configuration.									
		<table border="1"> <thead> <tr> <th>Bit nos.</th> <th colspan="2">Description</th> </tr> </thead> <tbody> <tr> <td>0 - 3</td> <td>Baud rate</td> <td>                     0 = 300                      1 = 600                      2 = 1200                      3 = 2400                      4 = 4800                      5 = 9600 (default)                 </td> </tr> <tr> <td>4 - 15</td> <td>Reserved</td> <td></td> </tr> </tbody> </table>	Bit nos.	Description		0 - 3	Baud rate	0 = 300 1 = 600 2 = 1200 3 = 2400 4 = 4800 5 = 9600 (default)	4 - 15	Reserved	
		Bit nos.	Description								
0 - 3	Baud rate	0 = 300 1 = 600 2 = 1200 3 = 2400 4 = 4800 5 = 9600 (default)									
4 - 15	Reserved										
4 - 15	Reserved										
6		Reserved.									
7	R/W	Control word for multi-parameter polling. For the purpose of multi-parameter polling, the PNOs are arranged in 16 blocks of 8. Bit 0 of this parameter controls block 0 (PNO 0 to 7), bit 1 controls block 1 (PNO 8 to 15) bit 15 controls block 15 (PNO 120 to 127). When a bit is 1 (default), a multi-parameter poll on this block operates normally. When a bit is 0, a multi-parameter poll on this block with PNO = multiple of 8, and CNO = 8 performs an enquiry poll instead (a pseudo-enquiry poll).									

Table 4. Block 0 PNOs

### 4.2.4. PNO Allocation

PNOs 0 to 7 (block 0) are defined in chapter 4.2.3. This section defines PNOs 8 to 127. The ASCII mnemonics are case sensitive, parameters in Block 0 are undefined in ASCII mode

**Block 1 :**

PNO	ASCII mnemonic	Tag No.	Access	Bit number	ASCII data format	Binary data format	Limits	Description
8	08	38	R/O	-	21	xxx.xx	-	DRIVE CURRENT (%)
9	09	60	R/O	-	21	xxx.xx	-	DRIVE LOAD (%)
10	0A	62	R/O	-	21	xxx.xx	-	EXT CURRENT LIMIT (%)
11	0B	39	R/O	-	21	xxx.xx	-	INVERTER FREQUENCY (%)
12	0C	61	R/O	-	21	xxx.xx	-	SPEED SETPOINT (%)
13	0D	85	R/O	-	21	xxx.x	-	INVERTER FREQUENCY (Hz)
14	0E	84	R/O	-	21	xxx.x	-	SPEED SETPOINT (Hz)
15	0F	58	R/O	-	23	xxxxx	-	DRIVE STATUS
	-	-	0				-	DRIVE STOPPED
	-	-	1				-	DRIVE RUNNING
	-	-	2				-	DRIVE AT ZERO SPEED
	-	-	3				-	DRIVE AT SPEED SETPOINT
	-	-	4				-	DRIVE RUNNING WITH I*T WARNING
	-	-	5				-	RESERVED
	-	-	6				-	RESERVED
	-	-	7				-	EXTERNAL TRIP
	-	-	8				-	D.C. LINK OVERVOLTAGE TRIP
	-	-	9				-	D.C. LINK UNDERVOLTAGE TRIP
	-	-	10				-	OVERCURRENT TRIP
	-	-	11				-	I*T TRIP
	-	-	12				-	STALL TRIP
	-	-	13				-	4-20MA CONTROL TRIP
	-	-	14				-	HEATSINK OVERTEMP TRIP
	-	-	15				-	MOTOR OVERTEMP TRIP

## Block 2 :

PNO	ASCII mnemonic	Tag No.	Access	Bit number	ASCII data format	Binary data format	Limits	Description
16	10	14	R/W	-	21	xxx.x	0.1 3000.0	RAMP UP TIME (sec)
17	11	13	R/W	-	21	xxx.x	0.1 3000.0	RAMP DOWN TIME (sec)
18	12	6	R/W <sup>2</sup>	-	21	xxx.xx	0 100.00	MAX SPEED (%)
19	13	7	R/W <sup>2</sup>	-	21	xxx.xx	0 100.00	MIN SPEED (%)
20	14	17	R/W	-	21	xxx.xx	50.00 150.00	MOTOR CURRENT LIMIT (%)
21	15	12	R/W <sup>2</sup>	-	21	xxx.xx	6.25 100.00	BASE SPEED (%)
22	16	18	R/W	-	21	xxx.xx	0.00 25.00	FIXED BOOST (%)
23	17	59	R/O	-	23	xxxxx	-	DIGITAL INPUTS
-	-	-	0				-	RUN /STOP
-	-	-	1				-	FRAMP
-	-	-	2				-	DIRECTION
-	-	-	3				-	EXTERNAL TRIP
-	-	-	4				-	JOG
-	-	-	5				-	PRESET 1
-	-	-	6				-	PRESET 2
-	-	-	7				-	LOCAL/REMOTE
-	-	-	8 - 15				-	RESERVED

## Block 3 :

PNO	ASCII mnemonic	Tag No.	Access	Bit number	ASCII data format	Binary data format	Limits	Description
24	18	8	R/W	-	21	xxx.xx	-100.00 100.00	PRESET SPEED 1 (%)
25	19	9	R/W	-	21	xxx.xx	-100.00 100.00	PRESET SPEED 2 (%)
26	1A	10	R/W	-	21	xxx.xx	-100.00 100.00	PRESET SPEED 3 (%)
27	1B	11	R/W	-	21	xxx.xx	-100.00 100.00	PRESET SPEED 4 (%)
28	1C	31	R/W	-	21	xxx.xx	50.00 105.00	I*T THRESHOLD (%)
29	1D	5	R/W	-	21	xxx.xx	0.00 100.00	AUX SETPOINT (%)
30	1E	165	R/W	-	21	xxx.xx	-100.00 100.00	JOG SPEED (%)
31	1F		-	-	23	xxxxx	(Note 1)	
	-	44	R/W	0			0 → 1	EXT TORQUE LIM SELECT
	-	55	R/W	1			0 → 1	AUX RUN
	-	56	R/W	2			0 → 1	AUX FRAMP
	-	57	R/W	3			0 → 1	AUX DIRECTION
	-	167	R/W	4			0 → 1	AUX JOG
	-	147	R/W <sup>2</sup>	5			0 → 1	AUTO BOOST ENABLE
	-	-	-	6 - 15				RESERVED

#### Block 4 :

PNO	ASCII mnemonic	Tag No.	Access	Bit number	ASCII data format	Binary data format	Limits	Description
32	20	19	R/W	-	21	xxx.xx	0.00 100.00	SKIP FRQ 1 CENTRE (%)
33	21	23	R/W	-	21	x.xx	0.00 8.34	SKIP FRQ 1 DELTA (%)
34	22	20	R/W	-	21	xxx.xx	0.00 100.00	SKIP FRQ 2 CENTRE (%)
35	23	24	R/W	-	21	x.x	0.00 8.34	SKIP FRQ 2 DELTA (%)
36	24	43	R/W	-	21	xxx.x	0.1 3000.0	FRAMP TIME (sec)
37	25	53	R/W	-	21	x.xx	0.00 4.17	SLIP COMP (%)
38	26	86	R/W	-	21	xxx.xx	-100.00 100.00	SERIAL LINK SETPOINT (%)
39	27		-	-	23	xxxxx	(Note 1)	
	-	27	R/W	0			0 → 1	SKIP FRQ 1 SELECT
	-	28	R/W	1			0 → 1	SKIP FRQ 2 SELECT
	-	-		2 - 15			-	RESERVED

#### Block 5 :

PNO	ASCII mnemonic	Tag No.	Access	Bit number	ASCII data format	Binary data format	Limits	Description
40	28	21	R/W	-	21	xxx.xx	0.00 100.00	SKIP FRQ 3 CENTRE (%)
41	29	25	R/W	-	21	x.xx	0.00 8.34	SKIP FRQ 3 DELTA (%)
42	2A	22	R/W	-	21	xxx.xx	0.00 100.00	SKIP FRQ 4 CENTRE (%)
43	2B	26	R/W	-	21	x.xx	0.00 8.34	SKIP FRQ 4 DELTA (%)
44	2C	171	R/W <sup>2</sup>	-	21	xxx.xx	0 100.00	S-RAMP % (%)
45	2D	213	R/W	-	21	x.xxxx	3.0000 -3.0000	LOCAL SETPOINT RATIO
46	2E	214	R/W	-	21	x.xxxx	3.0000 -3.0000	LOCAL SETPOINT DIVIDER
47	2F		-	-	23	xxxxx	(Note 1)	
	-	29	R/W	0				SKIP FRQ 3 SELECT
	-	30	R/W	1			0 → 1	SKIP FRQ 4 SELECT
	-	-	-	2 - 15			0 → 1	RESERVED

**Block 6 :**

PNO	ASCII mnemonic	Tag No.	Access	ASCII data format	Binary data format	Values	Description	
48	30	2	R/W	21	xxxxx	0	0V TO 10V SPEED SETPOINT	LOCAL SETPOINT
						1	-10V TO + 10V SPEED SETPOINT	
						2	AUX SPEED SETPOINT	
						3	PRESET SPEED 1	
						4	PRESET SPEED 2	
						5	PRESET SPEED 3	
						6	PRESET SPEED 4	
						7	PRESET SPEED 5	
						8	PRESET SPEED 6	
						9	PRESET SPEED 7	
						10	PRESET SPEED 8	
11	DIGITAL MOP							
49	31	3	R/W	21	xxxxx	0	0 TO 20mA SPEED SETPOINT	REMOTE SETPOINT SELECT
						1	20 TO 0mA SPEED SETPOINT	
						2	4 TO 20mA SPEED SETPOINT	
						3	20 TO 4mA SPEED SETPOINT	
						4	SERIAL LINK SPEED SETPOINT	
						5	DIGITAL PRESET SPEED SELECT	
6	SPEED FEEDBACK							
50	32	4	R/W <sup>2</sup>	21	xxxxx	0	120 Hz LIMIT	ULF SELECT
						1	240 Hz LIMIT	
						2	480 Hz LIMIT	
51	33	15	R/W <sup>2</sup>	21	xxxxx	0	RAMP DOWN	STOPPING MODE SELECT
						1	COAST DOWN	
						2	INJECTION BRAKING	
52	34	16	R/W <sup>2</sup>	21	xxxxx	3	RAMP DOWN + DC HOLDING PULSE	Vf CHARACTERISTIC
						0	LINEAR	
53	35	32	R/W <sup>2,3</sup>	21	xxxxx	1	FAN LAW	SWITCH FREQUENCY SELECT
						0	3k Hz CARRIER	
						1	6k Hz CARRIER	
54	36	36	R/W <sup>2</sup>	21	xxxxx	2	9k Hz	RELAY 1 CONFIG
						0	ZERO SPEED	
						1	AT SPEED	
						2	RUN CONFIRM	
						3	BRAKE CONTROL	
4	AT LOAD							
						5	AT FEEDBACK SPEED	

**Block 6 : (Continued)**

55	37	37	R/W <sup>2</sup>	21	xxxxx	0	ZERO SPEED	RELAY 2 CONFIG
						1	AT SPEED	
						2	RUN CONFIRM	
						3	BRAKE CONTROL	
						4	AT LOAD	
						5	AT FEEDBACK SPEED	

**Block 7**

PNO	ASCII mnemonic	Tag No.	Access	Bit No.	ASCII data format	Binary data format	Limits and values	Description	
56	38	115	R/W		21	xxx.xx	-150.00 - 50.00	REGEN CURRENT LIMIT (%)	
57	39	202	R/W	-	21	xxxxx	0	LOCAL & REMOTE	TRIM CHOICE
							1	LOCAL ONLY	
							2	REMOTE ONLY	
58	3A	131	R/W <sup>2</sup>		21	xxx.xx	0.00 100.00	BASE VOLTS (%)	
59	3B	132	R/W	-	21	xxxxx	0	MICRO AC DRIVE	MENU POSITION
							1	SPEED SP (Hz)	
							2	DRIVE FREQUENCY	
							3	MOTOR CURRENT	
							4	MOTOR LOAD	
							5	EXT TORQUE LIM	
							6	DRIVE STATUS	
							7	DIGITAL INPUTS	
							8	TORQUE MODE	
							9	PID ERROR	
							10	PID CLAMPED	
							11	PID OUTPUT	
							12	SPEED FB (RPM)	
							13	SPEED FB (HZ)	
							14	SPEED SP (RPM)	
							15	LOCAL SP (HZ)	
							16	REMOTE SP (HZ)	
60	3C	54	R/W	-	21	x.xx	0.00 4.17	STABILISATION (%)	
61	3D	134	R/W	-	21	xxxx.x	0.1 3000.0	STALL TRIP TIME (SEC)	
62	3E	136	R/W	-	21	xxx.xx	10.00 100.00	OP CURRENT CAL (%)	
63	3F		-	-	23	xxxxx	(Note 1)		
	-	116	R/W	0			0 → 1	REGEN LIM SELECT	
	-	128	R/W	1			0 → 1	RAMP HOLD SELECT	
	-	133	R/W	2			0 → 1	STALL TRIP ENABLE	
	-			3-15			-	RESERVED	

**Block 8**

PNO	ASCII mnemonic	Tag No.	Access	Bit number	ASCII data format	Binary data format	Limits	Description
64	40	137	R/W	-	21	xxx.xx	50.00 150.00	I*T UPPER LIMIT (%)
65	41	138	R/W	-	21	xx.x	5.0 60.0	I*T TIME (sec)
66	42	140	R/W	-	21	xxx.xx	0.00 150.00	BRAKE RELAY ON LOAD LEVEL (%)
67	43	141	R/W	-	21	xxx.xx	0.00 100.00	BRAKE RELAY ON FREQUENCY LEVEL (%)
68	44	142	R/W	-	21	xxx.xx	0.00 100.00	BRAKE RELAY OFF FREQUENCY LEVEL (%)
69	45	215	R/W	-	21	x.xxxx	3.0000 -3.0000	REMOTE SETPOINT RATIO
70	46	216	R/W	-	21	x.xxxx	3.0000 -3.0000	REMOTE SETPOINT DIVIDER
71	47							RESERVED

**Block 9**

PNO	ASCII mnemonic	Tag No.	Access	Bit No.	ASCII data format	Binary data format	Limits and values	Description
72	48	144	R/W	-	21		0 MIN TO MAX	RAMP OUTPUT TERMINAL CHOICE
							1 0 TO LIMIT FREQ	
							2 0 TO MAX	
73	49	172	R/W <sup>2</sup>	-	21		0 LINEAR RAMP	RAMP TYPE
							1 PARABOLIC RAMP	
							2 S RAMP	
74	4A	168	R/W	-	21	xxx.xx	100.00 -100.00	MAX MOP SPEED (%)
75	4B	169	R/W	-	21	xxx.xx	100.00 -100.00	MIN MOP SPEED (%)
76	4C	170	R/W	-	21	xxx.xx	100.00 -100.00	MOP PRESET SPEED (%)
77	4D	159	R/W	-	21	xxx.xx	100.00 0	ZERO SPEED THRESHOLD
78	4E	160	R/W	-	21	xxx.xx	100.00 0	AT SPEED THRESHOLD
79	4F							RESERVED

### Block 10

PNO	ASCII mnemonic	Tag No.	Access	Bit No.	ASCII data format	Binary data format	Limits and values	Description
80	50	161	R/W	-	21	xxx.xx	-100.00 100.00	PRESET SPEED 5 (%)
81	51	162	R/W	-	21	xxx.xx	-100.00 100.00	PRESET SPEED 6 (%)
82	52	163	R/W	-	21	xxx.xx	-100.00 100.00	PRESET SPEED 7 (%)
83	53	164	R/W	-	21	xxx.xx	-100.00 100.00	PRESET SPEED 6 (%)
84	54	166	R/W <sup>2</sup>	-	21		0 4 PRESET & JOG	RECONFIG I/PS
							1 8 PRESETS	
							2 DIGITAL MOP & PRESET	
85	55	178	R/W	-	21	xxx.xx	150.00 0	LOAD THRESHOLD (%)
86	56	179	R/W	-	21	xxx.xx	100.00 0	FEEDBACK SPEED THRESHOLD (%)
87	57	210	R/W	-	23	xxxxx	FFFF 0	AUTO RESTART TRIP MASK

### Block 11:

PNO	ASCII mnemonic	Tag No.	Access	Bit No.	ASCII data format	Binary data format	Limits and values	Description
88	58	205	R/W	-	21	xxx.xx	600.0 0.5	AUTO RESTART ATTEMPT DELAY (S)
89	59	211	R/W	-	21	xx	10 1	AUTO RESTART NUMBER OF ATTEMPTS
90	5A	217	R/O	-	21	xx	-	AUTO RESTART ATTEMPTS LEFT
91	5B	212	R/W	-	21	xxx.x	600.00 0.1	AUTO RESTART CANCEL TIME
92	5C							RESERVED
93	5D							RESERVED
94	5E							RESERVED
95	5F	-	-		23	xxxxx	(Note 1)	
	-	204	R/W	0			0 → 1	AUTO RESTART ENABLE
	-		-	1→15				RESERVED



**Block 12 & 13:**

PNO	ASCII mnemonic	Tag No.	Access	Bit number	ASCII data format	Binary data format	Limits	Description
96	60	91	R/W	-	21	xxxxx	0 → 255	POINTER FOR PNO 112 (MNEMONIC 70)
97	61	92	R/W	-	21	xxxxx	0 → 255	POINTER FOR PNO 113 (MNEMONIC 71)
98	62	93	R/W	-	21	xxxxx	0 → 255	POINTER FOR PNO 114 (MNEMONIC 72)
99	63	94	R/W	-	21	xxxxx	0 → 255	POINTER FOR PNO 115 (MNEMONIC 73)
100	64	95	R/W	-	21	xxxxx	0 → 255	POINTER FOR PNO 116 (MNEMONIC 74)
101	65	96	R/W	-	21	xxxxx	0 → 255	POINTER FOR PNO 117 (MNEMONIC 75)
102	66	97	R/W	-	21	xxxxx	0 → 255	POINTER FOR PNO 118 (MNEMONIC 76)
103	67	98	R/W	-	21	xxxxx	0 → 255	POINTER FOR PNO 119 (MNEMONIC 77)
104	68	99	R/W	-	21	xxxxx	0 → 255	POINTER FOR PNO 120 (MNEMONIC 78)
105	69	100	R/W	-	21	xxxxx	0 → 255	POINTER FOR PNO 121 (MNEMONIC 79)
106	6A	101	R/W	-	21	xxxxx	0 → 255	POINTER FOR PNO 122 (MNEMONIC 7A)
107	6B	102	R/W	-	21	xxxxx	0 → 255	POINTER FOR PNO 123 (MNEMONIC 7B)
108	6C	103	R/W	-	21	xxxxx	0 → 255	POINTER FOR PNO 124 (MNEMONIC 7C)
109	6D	104	R/W	-	21	xxxxx	0 → 255	POINTER FOR PNO 125 (MNEMONIC 7D)
110	6E	105	R/W	-	21	xxxxx	0 → 255	POINTER FOR PNO 126 (MNEMONIC 7E)
111	6F	106	R/W	-	21	xxxxx	0 → 255	POINTER FOR PNO 127 (MNEMONIC 7F)

## Block 14 & 15:

This block on PNOs and mnemonics are configurable. The tags to which they point are defined by PNOs 60 to 6F in blocks 12 and 13.

PNO	ASCII mnemonic	Tag No.	Access	Bit No.	ASCII data format	Binary data format	Limits	Description
112	70	(PNO 96)	*	-	*	*	*	CONFIGURABLE MNEMONIC 1
113	71	(PNO 97)	*	-	*	*	*	CONFIGURABLE MNEMONIC 2
114	72	(PNO 98)	*	-	*	*	*	CONFIGURABLE MNEMONIC 3
115	73	(PNO 99)	*	-	*	*	*	CONFIGURABLE MNEMONIC 4
116	74	(PNO 100)	*	-	*	*	*	CONFIGURABLE MNEMONIC 5
117	75	(PNO 101)	*	-	*	*	*	CONFIGURABLE MNEMONIC 6
118	76	(PNO 102)	*	-	*	*	*	CONFIGURABLE MNEMONIC 7
119	77	(PNO 103)	*	-	*	*	*	CONFIGURABLE MNEMONIC 8
120	78	(PNO 104)	*	-	*	*	*	CONFIGURABLE MNEMONIC 9
121	79	(PNO 105)	*	-	*	*	*	CONFIGURABLE MNEMONIC 10
122	7A	(PNO 106)	*	-	*	*	*	CONFIGURABLE MNEMONIC 11
123	7B	(PNO 107)	*	-	*	*	*	CONFIGURABLE MNEMONIC 12
124	7C	(PNO 108)	*	-	*	*	*	CONFIGURABLE MNEMONIC 13
125	7D	(PNO 109)	*	-	*	*	*	CONFIGURABLE MNEMONIC 14
126	7E	(PNO 110)	*	-	*	*	*	CONFIGURABLE MNEMONIC 15
127	7F	(PNO 111)	*	-	*	*	*	CONFIGURABLE MNEMONIC 16

\* = The access, data format and limits depend on the tag to which the corresponding pointer points.

### 4.2.5. Enquiry Polling

In normal enquiry polling mode, block 1 is polled.

### 4.2.6. Additional Features

1. There is an option on the way in which two-state (binary) parameters return values when polled. These are accessible only via the configurable PNOs. If ESP SUPPORT is disabled, the data part of the message consists of

> x

where x = 0 or 1. Thus the message length is minimised.

If ESP SUPPORT is enabled, the data part of the message consists of

> 0 0 0 X

where X = 0 or 1. This option is intended for use with Eurotherm ESP devices. When sending a selection message to these parameters, any leading zeros are ignored.

2. On the main RS485 serial port (P1), the parity is even by default, but may be switched to odd via the MMI.

### 4.2.7. References

1. Eurotherm International Bisynch Communications Handbook Part No. HP022047C

### 4.2.8. Notes

1. The reserved bits in these parameters return zero for a poll. The state for a selection is immaterial.
2. Access to these parameters is read/write if the drive is not running or read-only if the drive is running.
3. The range of its parameter is restricted as a function of the drive power rating. For 585 and 586 power ratings the switching frequency is limited to 6kHz.

## CHAPTER 5 - Tag List


Tag	Description	Default	Min	Max		User Setting
0	Unallocated	-	-	-	-	-
1	Eprom vesion number	-	-	-	-	-
2	Local setpoint select	0V to 10V	0	11	RW	
3	Remote setpoint select	0mA to 20mA	0	6	RW	
4	Limit frequency select	120Hz	0	2	RW	
5	Aux speed setpoint	0.00%	-10000	10000	RW	
6	Max speed	41.67%	0	10000	RW	
7	Min speed	0.00%	0	10000	RW	
8	Preset speed 1	0.00%	-10000	10000	RW	
9	Preset speed 2	0.00%	-10000	10000	RW	
10	Preset speed 3	0.00%	-10000	10000	RW	
11	Preset speed 4	0.00%	-10000	10000	RW	
12	Base speed	41.67%	625	10000	RW	
13	Ramp down time	10.0s	1	30000	RW	
14	Ramp up time	10.0s	1	30000	RW	
15	Stopping mode	Ramp down	0	3	RW	
16	Vf characteristic	Linear law	0	1	RW	
17	Motor current limit	100.00%	5000	15000	RW	
18	Fixed Boost	0.00%	0	2500	RW	
19	Skip frequency 1 centre	0.00%	0	10000	RW	
20	Skip frequency 2 centre	0.00%	0	10000	RW	
21	Skip frequency 3 centre	0.00%	0	10000	RW	
22	Skip frequency 4 centre	0.00%	0	10000	RW	
23	Skip frequency 1 delta	0.00%	0	834	RW	
24	Skip frequency 2 delta	0.00%	0	834	RW	
25	Skip frequency 3 delta	0.00%	0	834	RW	
26	Skip frequency 4 delta	0.00%	0	834	RW	
27	Skip frequency 1 select	Disabled	0	1	RW	
28	Skip frequency 2 select	Disabled	0	1	RW	
29	Skip frequency 3 select	Disabled	0	1	RW	
30	Skip frequency 4 select	Disabled	0	1	RW	
31	I*t threshold	105.00%	5000	10500	RW	
32	Switch frequency select	3kHz	0	2	RW	
33	MMI menu delay	20	0	200	RW	
34	Reserved	-	-	-	-	-
35	Reserved	-	-	-	-	-
36	Relay 1 configuration	Zero speed	0	5	RW	
37	Relay 2 configuration	At speed	0	5	RW	
38	Drive current	-	-20000	20000	RO	
39	Inverter frequency	-	-10000	10000	RO	
40	Enter password	0x0000	0	FFFF	RW	
41	Change password	0x0000	0	FFFF	RW	
42	Reserved	-	-	-	-	-
43	Framp time	1.0s	1	30000	RW	

Tag	Description	Default	Min	Max		User Setting
44	External torque limit select	Disabled	0	1	RW	
45	Reserved	-	-	-	-	-
46	Reserved	-	-	-	-	-
47	Reserved	-	-	-	-	-
48	Reserved	-	-	-	-	-
49	Reserved	-	-	-	-	-
50	Reserved	-	-	-	-	-
51	Reserved	-	-	-	-	-
52	Reserved	-	-	-	-	-
53	Slip compensation	0.0Hz	0	417	RW	
54	Stabilisation	0.6Hz	0	417	RW	
55	Aux run	Enabled	0	1	RW	
56	Aux framp	Enabled	0	1	RW	
57	Aux direction	Enabled	0	1	RW	
58	Drive status	-	0	FFFF	RO	
59	Digital inputs	-	0	00FF	RO	
60	Drive load	-	-20000	20000	RO	
61	Speed setpoint	-	-10000	10000	RO	
62	External torque limit	-	0	15000	RO	
63	Reserved	-	-	-	-	-
64	Reserved	-	-	-	-	-
65	P1 serial link enable	Enabled	0	1	RO	
66	P3 serial link enabled	Enabled	0	1	RO	
67	P1 GID	0	0	7	RO	
68	P3 GID	0	0	7	RO	
69	P1 UID	0	0	15	RO	
70	P3 UID	0	0	15	RO	
71	P1 mode	Ascii	0	1	RO	
72	P3 mode	Ascii	0	1	RO	
73	P1 baud	9600	0	4	RO	
74	P3 baud	9600	0	4	RO	
75	P1 esp support (ascii)	Disabled	0	1	RW	
76	P3 esp support (ascii)	Disabled	0	1	RW	
77	P1 changeband (bin)	0.0%	0	32767	RW	
78	P3 changeband (bin)	0.0%	0	32767	RW	
79	P1 error report	-	0	FFFF	RO	
80	P3 error report	-	0	FFFF	RO	
81	P1 pno.7	0x0000	0	FFFF	RW	
82	P3 pno.7	0x0000	0	FFFF	RW	
83	P1 parity	Even	0	1	RO	
84	Speed setpoint (Hz)	-	-10000	10000	RO	
85	Inverter frequency (Hz)	-	-10000	10000	RO	
86	Serial link setpoint	0.0Hz	-10000	10000	RW	
87	Serial link buffer length	-	0	FFFF	RO	
88	Serial link config information	-	0	FFFF	RO	
89	Serial link instrument identifier	-	0	FFFF	RO	

Tag	Description	Default	Min	Max		User Setting
90	Serial link mode number	-	0	FFFF	RO	
91	Pointer for pno 112	0	0	255	RW	
92	Pointer for pno 113	0	0	255	RW	
93	Pointer for pno 114	0	0	255	RW	
94	Pointer for pno 115	0	0	255	RW	
95	Pointer for pno 116	0	0	255	RW	
96	Pointer for pno 117	0	0	255	RW	
97	Pointer for pno 118	0	0	255	RW	
98	Pointer for pno 119	0	0	255	RW	
99	Pointer for pno 120	0	0	255	RW	
100	Pointer for pno 121	0	0	255	RW	
101	Pointer for pno 122	0	0	255	RW	
102	Pointer for pno 123	0	0	255	RW	
103	Pointer for pno 124	0	0	255	RW	
104	Pointer for pno 125	0	0	255	RW	
105	Pointer for pno 126	0	0	255	RW	
106	Pointer for pno 127	0	0	255	RW	
107	Reserved	-	-	-	-	-
108	Reserved	-	-	-	-	-
109	Reserved	-	-	-	-	-
110	Reserved	-	-	-	-	-
111	Reserved	-	-	-	-	-
112	Reserved	-	-	-	-	-
113	Reserved	-	-	-	-	-
114	Reserved	-	-	-	-	-
115	Regen current limit	-100.00%	-15000	-5000	RW	
116	Regen current limit select	Enabled	0	1	RW	
117	Feedback source	None	0	1	RW	
118	Pole pairs	2	1	4	RW	
119	Encoder lines	1000	1	10000	RW	
120	Speed feedback (rpm)	-	-28000	28000	RO	
121	Speed feedback	-	-10000	10000	RO	
122	Encoder sign	Positive	0	1	RW	
123	Reserved	-	-	-	-	
124	Reserved	-	-	-	-	-
125	Reserved	-	-	-	-	-
126	Reserved	-	-	-	-	-
127	Reserved	-	-	-	-	-
128	Ramp hold select	Disabled	0	1	RW	
129	Eeprom write	Inactive	0	2	RW	
130	Reserved	-	-	-	-	-
131	Base volts	100.00%	0	11547	RW	
132	Menu position	Micro AC drive	0	16	RW	
133	Stall enable	Enabled	0	1	RW	
134	Stall trip time	600.0s	1	30000	RW	
135	Reserved	-	-	-	-	-
136	Op current cal	100.00%	1000	10000	RW	

Tag	Description	Default	Min	Max		User Setting
137	I*t upper limit	150.00%	5000	15000	RW	
138	I*t time	60.0s	50	600	RW	
139	Reserved	-	-	-	-	-
140	Brake relay on load level	50.00%	0	15000	RW	
141	Brake relay on frequency level	4.17%	0	10000	RW	
142	Breke relay off frequency level	2.50%	0	10000	RW	
143	Reserved	-	-	-	-	-
144	Ramp output terminal choice	Min to max	0	2	RW	
145	Reserved	-	-	-	-	
146	Torque mode	Const torque	0	1	RO	
147	Auto boost enable	Disabled	0	1	RW	
148	Reserved	-	-	-	-	
149	Reserved	-	-	-	-	-
150	Reserved	-	-	-	-	-
151	Reserved	-	-	-	-	-
152	Reserved	-	-	-	-	-
153	Reserved	-	-	-	-	-
154	Reserved	-	-	-	-	-
155	Reserved	-	-	-	-	-
156	Reserved	-	-	-	-	-
157	Reserved	-	-	-	-	-
158	Reserved	-	-	-	-	-
159	Zero speed relay threshold	83	0	10000	RW	
160	At speed relay threshold	83	0	10000	RW	
161	Preset speed 5	0.00%	-10000	10000	RW	
162	Preset speed 6	0.00%	-10000	10000	RW	
163	Preset speed 7	0.00%	-10000	10000	RW	
164	Preset speed 8	0.00%	-10000	10000	RW	
165	Jog speed	4.17%	-10000	10000	RW	
166	Reconfig i/ps	4 presets & jog	0	2	RW	
167	Aux jog	Enabled	0	1	RW	
168	Max mop speed	100.00%	-10000	10000	RW	
169	Min mop speed	0.00%	-10000	10000	RW	
170	Mop preset speed	0.00%	-10000	10000	RW	
171	S-ramp %	100.00%	0	10000	RW	
172	Ramp type	Linear ramp	0	2	RW	
173	Reserved	-	-	-	-	-
174	Reserved	-	-	-	-	-
175	Reserved	-	-	-	-	-
176	Reserved	-	-	-	-	-
177	Reserved	-	-	-	-	-
178	Load relay threshold	50.00%	0	15000	RW	
179	Feedback speed relay threshold	8.34%	0	10000	RW	
180	Reserved	-	-	-	-	-
181	PID derivative tc	0.000s	0	10000	RW	
182	PID integral tc	1.00s	1	10000	RW	

Tag	Description	Default	Min	Max		User Setting
183	PID filter tc	2.000s	0	10000	RW	
184	PID prop gain	1.0	0	1000	RW	
185	PID positive limit	100.00%	0	10500	RW	
186	PID negative limit	-100.00%	0	-10500	RW	
187	PID o/p scaler (trim)	0.0417	-30000	30000	RW	
188	PID enable	Disabled	0	1	RW	
189	PID integral defeat	Off	0	1	RW	
190	PID input 1	0.00%	-30000	30000	RW	
191	PID input 2	0.00%	-30000	30000	RW	
192	PID ratio1	1.0000	-30000	30000	RW	
193	PID ratio 2	1.0000	-30000	30000	RW	
194	PID divider 1	1.0000	-30000	30000	RW	
195	PID divider 2	1.0000	-30000	30000	RW	
196	PID error	-	-30000	30000	RO	
197	PID clamped	-	0	1	RO	
198	PID output	-	-30000	30000	RO	
199	PID sp choice	None	0	4	RW	
200	PID fb choice	None	0	4	RW	
201	PID op choice	None	0	4	RW	
202	Trim choice	Local & remote	0	2	RW	
203	PID op mode	Unipolar	0	1	RW	
204	Auto restart enable	Disabled	0	1	RW	
205	Auto restart attempt delay	100	5	6000	RW	
206	Flycatching Enable	Disabled	1	0	RW	
207	Speed setpoint (rpm)	-	-28000	28000	RO	
208	Local speed setpoint	-	-10000	10000	RO	
209	Remote speed setpoint	-	-10000	10000	RO	
210	Auto restart trip mask	0x1F00	0	FFFF	RW	
211	Auto restart number of attempts	5	1	10	RW	
212	Auto restart cancel time	3000	1	6000	RW	
213	Local setpoint ratio	1.0000	-30000	30000	RW	
214	Local setpoint divider	1.0000	-30000	30000	RW	
215	Remote setpoint ratio	1.0000	-30000	30000	RW	
216	Remote setpoint divider	1.0000	-30000	30000	RW	
217	Auto restart attempts left	-	0	10	RO	
218	Flycatching search volts	15.00%	0	10000	RW	
219	Reserved	-	-	-	-	-
220	Reserved	-	-	-	-	-
221	Flycatching search time	5.0s	1	100	RW	
222	Flycatching reflux time	2.0s	1	100	RW	
223	Flycatching search mode	Bidirectional	0	2	RW	
224	Reserved	-	-	-	-	-
225	Flycatching min search speed	834	0	10000	RW	
226	Reserved	-	-	-	-	-
227	Reserved	-	-	-	-	-
228	Reserved	-	-	-	-	-

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