

GE Consumer & Industrial
Electrical Distribution

AF-600 FP™ Metasys Operating Instructions



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1 Overview

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1.1.1 Software Version

AF-600 FP Software version: 2.12



This guide can be used with all AF-600 FP frequency converters with software version 2.12 or later

The actual software version number can be read from par. ID-43 *Software Version*.

1.1.2 Introduction

The frequency converter control board is program selectable for use with the Johnson Controls Metasys N2 protocol. Metasys N2 is a master/slave control network. The physical layer is RS485 compatible, half duplex 9600 baud shielded twisted pair. The N2 software protocol is designed to be general in nature to accommodate the unique properties each device type may have. Every device connection to the N2 network can be thought of as a small data manager. Data points in the database are classified as analog I/O (floating point), binary I/O or integer data points - floats, integers or bytes. Each data type has its own unique structure defined in the Metasys N2 system Protocol Specification for Vendors.

The information in this manual is intended to provide you with comprehensive information on how to install and set up the frequency converter for communication over a Metasys network.

For specific information on operation of the drive, refer to the *AF-600 FP Operating Instructions*



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It has been assumed that all devices will be sitting behind a firewall that does packet filtering and the environment has well-implemented restrictions on the software that can run inside the firewall. All nodes are assumed to be "trusted" nodes.

1.1.4 About this Manual

This manual is for both instructional and for reference purposes. This manual can also serve as a guideline when you specify and optimize your communication system.

It is highly recommended that you read this manual in its entirety before initiating any programming. It is assumed that the user has full knowledge of the capabilities and limitation of the controller node in addition to full knowledge of the frequency converter.

1.1.5 References

In addition to this manual, the following two manuals should be consulted: *AF-600 FP Operating Instructions* and *Johnson Controls METASYS N2 System Protocol Specification for Vendors*, Johnson Controls number 04-3402-22, rev A.



2 Instructions

2.1.1 Abbreviations and Definitions

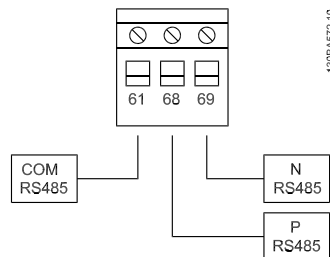
Abbreviations and definitions

ACK	Acknowledge
ADF	Internal Floating Points
ADI	Internal Integers
AI	Analog Inputs
AO	Analog Outputs
BI	Binary Inputs
BO	Binary Outputs
COS	Change Of State
HPFB	High Performance Field Network
JCI	Johnson Controls Inc. developers of the METASYS N2 protocol
N2	METASYS N2
N2 master	A N2 master is either a PC with JCI software or a dedicated JCI controller
NAK	Not acknowledged
NPA	N2 Point Address (Each N2 Point Type has a address range from 0 to 255)
NPT	N2 Point Type
PAR	Parameter Number

2.1.2 Network Connection

Connect signal wires to terminal 68 (N+) and terminal 69 (N-) on main control board of the drive. If shielded cabling is used, connect one end of the shield to terminal 61. This terminal is connected to ground via an internal RC link. It is highly recommended to use twisted-pair cables to reduce the differential mode interference between the conductors

Torque Specifications:	4.5 in.lb. (0.5 Nm)
Control wire:	18 - 24 AWG, shielded, twisted pair





2.1.3 Hardware Set-up

RS485 Network Connection:

One or more frequency converters can be connected to a control (or master) using the RS485 standardized interface. Terminal 68 is connected to the P signal (TX +, RX+), while terminal 69 is connected to the N signal (TX-, RX-). If more than one frequency converter is connected to a master, use parallel connections.

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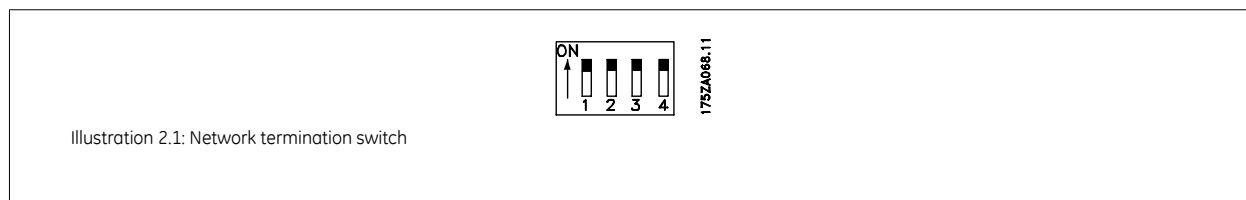
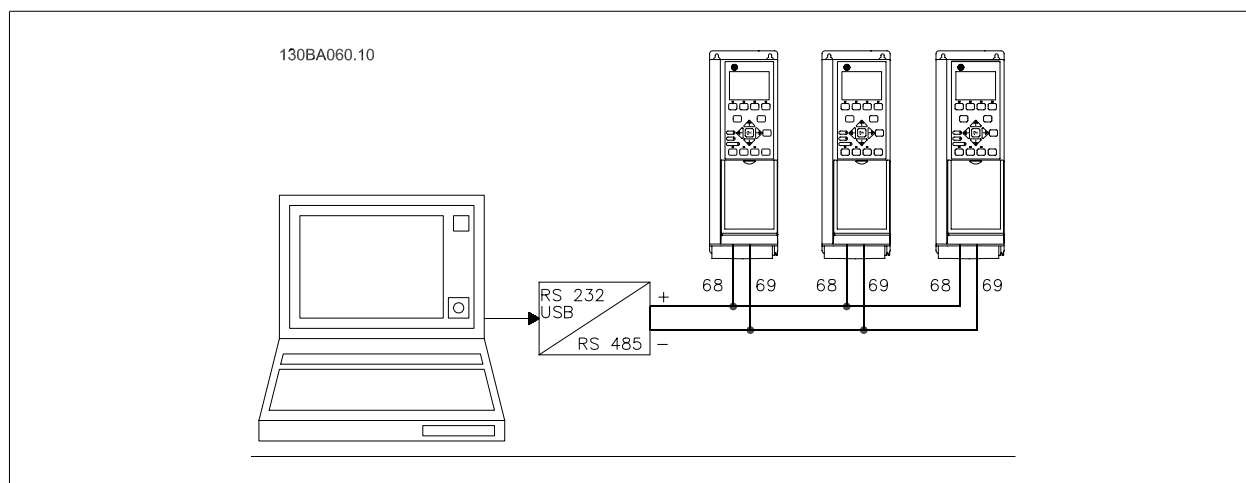


Illustration 2.1: Network termination switch

In order to avoid potential equalizing currents in the screen, earth the cable screen via terminal 61, which is connected to the frame via an RC-link.

Network termination: The RS485 network must be terminated by a resistor network at both ends. For this purpose, set switch S801 on the control card to "ON".

For more information, see the paragraph: Switches S201, S202 and S801.

NB!

Communication protocol must be set to Drive MC par. 0-30.



2.1.4 Error Codes

Error codes

Error Code 00	is issued after power up or after a time out where all overridden points were released, as long as no Identify yourself command has been issued by the master.
Error Code 01	is issued if the command is not supported or not known by the drive.
Error Code 02	is issued if the received message has a checksum error.
Error Code 03	is issued if the N2 message receive buffer exceeds 256 characters.
Error Code 05	is issued if the received N2 message is too long.
Error Code 10	is issued the data is out of expected range
Error Code 11	is issued when: 1. A point attributes or attribute bit is unused. 2. A point attributes or attribute bit is for JCI use only. 3. An internal data point attribute for current value can not be changed while running
Error Code 12	is issued when: 1. The N2 master tries to change attribute 2 bit 6 "Current State" on a BO and the drive is tripped. 2. The N2 master tries to change attribute 2 bit 6 "Current State" on a BO and the drive is trip locked except for BO 5 "reset"

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2.1.5 Drive Parameters

The following parameters may need to be manually set for each drive in the Metasys N2 network. Refer to the Installation, Operation and Maintenance Manual for the frequency converter for programming.

Parameter list

DRIVEPARAMETER	DESCRIPTION	DEFAULT	DESIRED SETTING
O-01	Control Side	Digital & Ctrl. Word	
O-02	Control Source	Drive Port	Drive Port
O-03	Control Word Timeout	60 s	1-18000 s
O-30	Protocol	Drive	Metasys N2
O-31	Address	1	1-255
O-32	Drive Port Baud Rate	9600	Fixed to 9600
O-33	Drive Port Parity	Even, 1stop	Fixed to No Parity, 1stop
O-37	Maximum Inter-char Delay		25 s for Metasys N2



2.1.6 General Commands (Acknowledged)

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DRIVE Response	Command	Subcommand	NPA Object no.	Attribute Message Type	Error Code	Comments
ACK	0	4	-	Poll Message No Acknowledge	-	The slave is to respond with any data points, analog or binary I/O that have been flagged for COS
ACK	0	5	-	Poll message With Acknowledge	-	The slave is to respond with any data points, analog or binary I/O that have been flagged for COS
ACK	0	9	-	Status update Message	-	Slave device must respond with device manufacturing model number (Par. AN-21), days in service (Par. AN-00) and device status
ACK	F	-	-	Identify Device Type	-	Slave device responds with an identification number of 10H to indicate non JCI device
ACK	0	0	-	Synch Time	-	The internal clock is synchronized by this command
ACK, no action	8	0	-	Upload	-	Optional, no support in the frequency converter
ACK, no action	8	1	-	Upload	-	Optional, no support in the frequency converter
ACK, no action	8	3	-	Upload Record	-	Optional, no support in the frequency converter
ACK, no action	8	4	-	Upload Complete	-	Optional, no support in the frequency converter
ACK, no action	9	0	-	Download	-	Optional, no support in the frequency converter
ACK, no action	9	1	-	Download	-	Optional, no support in the frequency converter
ACK, no action	9	3	-	Download	-	Record optional, no support in the frequency converter
ACK, no action	9	4	-	Download Complete	-	Optional, no support in the frequency converter
NAK	0	1	-	Read Memory	01	Slave device memory read based on memory addresses
NAK	0	8	-	Warm Start	01	JCI use only

Table 2.1: No Region, Attribute Number and -type in this table.



2.1.7 Analog Input Commands (Acknowledged)

DRIVE Response	Command	Subcommand	Region	NPA Object no.	Attribute No.	Attribute Message Type		Comments
ACK	1	-	1	0-23	1	Byte	Read Analog Input	Read Object Configuration attribute associated with each individual point
ACK	1	-	1	0-23	2	Byte	Read Analog Input	¹⁾ Read Object Status attribute associated with each individual point
ACK	1	-	1	0-23	3	Float	Read Analog Input	²⁾ Read Analog Input Value attribute associated with each individual point
ACK	1	-	1	0-23	8	Float	Read Analog Input	Read Low Alarm attribute associated with each individual point
ACK	1	-	1	0-23	9	Float	Read Analog Input	Read Low Warning attribute associated with each individual point
ACK	1	-	1	0-23	10	Float	Read Analog Input	Read High Warning attribute associated with each individual point
ACK	1	-	1	0-23	11	Float	Read Analog Input	Read High Alarm attribute associated with each individual point
ACK	1	-	1	0-23	12	Float	Read Analog Input	Read Differential attribute associated with each individual point
ACK	2	-	1	0-23	1	Byte	Write Analog Input	Write to Object Configuration attribute associated with each individual point
ACK	2	-	1	0-23	8	Float	Write Analog Input	Write to Low Alarm Limit attribute associated with each individual point
ACK	2	-	1	0-23	9	Float	Write Analog Input	Write to Low Warning Limit attribute associated with each individual point
ACK	2	-	1	0-23	10	Float	Write Analog Input	Write to High Warning Limit attribute associated with each individual point
ACK	2	-	1	0-23	11	Float	Write Analog Input	Write to High Alarm Limit attribute associated with each individual point
ACK	2	-	1	0-23	12	Float	Write Analog Input	Write to Differential attribute associated with each individual point
ACK, no action	7	2	1	0-23	-	Float	Override Analog inputs	Analog inputs are "outputs" from the frequency converter and should not be written over by the network controller
ACK, no action	7	3	1	0-23	-	-	Override Analog Release	Analog inputs are "outputs" from the frequency converter and should not be written over by the network controller
ACK, no action	7	7	1	0-23	-	-	Write Analog Input Attributes	Optional command for slave devices. Only used for N2 commissioning purposes

Table 2.2: No Error code in this table.



2.1.8 Analog Input Commands (Not Acknowledged)

2

DRIVE Response	Com-mand	Region	NPA Object no.	Attribu-te No.	Attribute Message Type		Error Code	Comments
NAK	1	1	0-23	4	Float	Read Analog Input	11 ¹⁾	Read Linear Ranging Parameter 1 attribute associated with each individual point. (JCI use only)
NAK	1	1	0-23	5	Float	Read Analog Input	11 ¹⁾	Read Linear Ranging Parameter 2 attribute associated with each individual point. (JCI use only)
NAK	2	-	0-23	2	Byte	Write Analog Input	11 ¹⁾	Object Status writeable
NAK	2	-	0-23	3	Float	Write Analog Input	11 ¹⁾	Analog Input Value not writeable
NAK	2	-	0-23	4	Float	Write Analog Input	11 ¹⁾	Write to Linear Ranging Parameter 1 attribute associated with each individual point. (JCI use only)
NAK	2	-	0-23	5	Float	Write Analog Input	11 ¹⁾	Write to Linear Ranging Parameter 2 attribute associated with each individual point. (JCI use only)
NAK	2	-	0-23	6	Float	Write Analog Input	11 ¹⁾	Write to Linear Ranging Parameter 3 attribute associated with each individual point. (JCI use only)
NAK	2	-	0-23	7	Float	Write Analog Input	11 ¹⁾	Write to Linear Ranging Parameter 4 attribute associated with each individual point. (JCI use only)
NAK	2	-	0-23	13	Integer	Write Analog Input	11 ¹⁾	Write to Filter Weight attribute associated with each individual point. (JCI use only)
NAK	2	-	0-23	14	Float	Write Analog Input	11 ¹⁾	Write to AI Offset attribute associated with each individual point. (JCI use only)

¹⁾ Error code 11 is used because attributes are considered as fields/records in the point map database.

Table 2.3: No Subcommand column in this table.



2.1.9 Analog Output Commands (Acknowledged)

DRIVE Response	Command	Sub command	Region	NPA Object no.	Attribute No.	Attribute Message Type		Comments
ACK	1	-	3	0-2	1	Byte	Read Analog Output	Read Object Configuration attribute associated with each individual point
ACK	1	-	3	0-2	2	Byte	Read Analog Output	Read Object Status attribute associated with each individual point
ACK	0	9	-	-	-	-	Status update Message	Slave device must respond with device manufacturing model number (Par. AN-21), days in service (Par. AN-00) and device status
ACK	1	-	3	0-2	3	Float	Read Analog Output	Read Current Value attribute associated with each individual point
ACK	2	-	3	0-2	1	Byte	Write Analog Output	Write to Object Configuration attribute associated with each individual point
ACK	7	2	3	0-2	-	Float	Override Analog Output	Write to analog output current value (frequency setpoint)
ACK	7	2	3	0-2	-	Float	Override Analog Output	Write to analog output current value (frequency setpoint)
ACK	7	3	3	0-2	-	-	Override Release	Set the current value, the value that it was before the 1. Override Command was issued
ACK, no action	7	7	3	0-2	-	-	Write Analog Output	Optional command for slave devices. Only used for N2 Attributes commissioning purposes. Not to be implemented at this time
ACK, no action	7	8	3	0-2	-	-	Read Analog Output Attributes	Optional command for no action slave devices. Only used for N2 commissioning purposes. Not to be implemented at this time

Table 2.4: No Error Code column in this table.



2.1.10 Analog Output Commands (Not Acknowledged)

2

DRIVE Response	Command	Region	NPA Object no.	Attribute No.	Attribute Message Type		Error Code	Comments
0-2	1	3	0-2	4	Float	Read Analog Output	11 ¹	Read Low Linear Ranging Parameter attribute associated with each individual point. (JCI use only)
NAK	1	3	0-2	5	Float	Read Analog Output	11 ¹	Read High Linear Ranging Parameter attribute associated with each individual point. (JCI use only)
NAK	2	3	0-2	2	Byte	Write Analog Output	11 ¹	Object Status not writeable
NAK	2	3	0-2	3	Float	Write Analog Output	11 ¹	Write to Current Value structure attributes associated with each individual point. (N2 does not support this, override function must be used)
NAK	2	3	0-2	4	Float	Write Analog Output	11 ¹	Write Debouncing Value in msec attribute associated with each individual point.(JCI use only)
NAK	2	3	0-2	5	Float	Write Analog Output	11 ¹	Write Accumulator value attribute associated with each individual point. (JCI use only)

¹ Error code 11 is used because attributes are considered as fields/records in the point map database.

Table 2.5: No Subcommand column in this table.



2.1.11 Binary Input (BI) Commands (Acknowledged)

DRIVE Response	Command	Subcommand	Region	NPA Object no.	Attribute No.	Attribute Message Type		Comments
ACK	1	-	2	0-135	1	Byte	Read Binary Input	Read Object Configuration attribute associated with each individual point
ACK	1	-	2	0-135	2	Byte	Read Binary Input	Read Object Status attribute associated with each individual point
ACK	2	-	2	0-135	1	Byte	Write Binary Input	Write to Object Configuration attribute associated with each individual point
ACK, no action	7	2	2	0-135	-	Byte(0/1)	Override Binary Input	Binary inputs are "outputs" from the frequency converter and should not be written over by the network controller. (Status word, Warnings, and Alarms)
ACK, no action	7	3	2	0-135	-	-	OverrideRelease	Binary inputs are "outputs" from the drive and should not be written over by the network controller. (Status word, Warnings and Alarms)
ACK, no action	7	7	2	0-135	-	-	Write Binary Input	Optional command for slave devices. Only Attributes used for N2 commissioning purposes. Not to be implemented at this time
ACK, no action	7	8	2	0-135	-	-	Read Binary Input	Optional command for Attributes slave devices. Only used for N2 commissioning purposes. Not to be implemented at this time

2.1.12 Binary Input (BI) Commands (Not Acknowledged)

DRIVE Response	Command	Region	NPA Object no.	Attribute No.	Attribute Message Type		Error Code	Comments
NAK	2	2	0-135	2	Byte	Write Binary Input	11 ¹	Object Status not writeable
NAK	2	2	0-135	3	Integer	Write Binary Input	11 ¹	Write Debouncing Value in msec attribute associated with each individual point.(JCI use only)
NAK	2	2	0-135	4	Integer32	Write Binary Input	11 ¹	Write Accumulator value attribute associated with each individual point (JCI use only)

Table 2.6: No Subcommand column in this table.



2.1.13 Binary Output Commands (Acknowledged)

DRIVE Response	Com-mand	Subcom-mand	Region	NPA Object no.	Attribute No.	Attribute Message Type		Comments
ACK	1	-	4	0-10	1	Byte	Read Binary Output	Read structure attributes associated with each individual point
ACK	1	-	4	0-10	2	Byte	Read Binary Output	Read structure attributes associated with each individual point
ACK	2	-	4	0-10	1	Byte	Write Binary Output	Write to Object Configuration attribute associated with each individual point
ACK	7	2	4	0-10	-	Byte(0/1)	Override Binary Output	Write to binary output current state (Drive control word)
ACK	7	2	4	0-10	-	Byte(0/1)	Override Binary Output	Write to binary output current state (Drive control word)
ACK	7	3	4	0-10	-	-	Override Release	Set the current value, the value that it was before the 1. Override Command was issued
ACK, no action	1	-	4	0-10	3	Integer	Read Binary Output	Read Minimum On-time attribute associated with each individual point. Return value = 0
ACK, no action	1	-	4	0-10	4	Integer	Read Binary Output	Read Minimum Off-time attribute associated with each individual point. Return value = 0
ACK, no action	1	-	4	0-10	5	Integer	Read Binary Output	Read Maximum Cycles/ Hour attribute associated with each individual point. Return value = 0
ACK, no action	2	-	4	0-10	3	Integer	Write Binary Output	Write Minimum On-time attribute associated with each individual point
ACK, no action	2	-	4	0-10	4	Integer	Write Binary Output	Write Minimum Off-time attribute associated with each individual point
ACK, no action	2	-	4	0-10	5	Integer	Write Binary Output	Write Maximum Cycles/ Hour attribute associated with each individual point
ACK, no action	7	7	4	0-10	-	-	Write Binary Output	Optional command for slave devices. Only Attributes used for N2 commissioning purposes
ACK, no action	7	8	4	0-10	-	-	Read Binary Output	Optional command for slave devices. Only Attributes used for N2 commissioning purposes

Table 2.7: No Error Code column in this table.

2.1.14 Binary Output (BO) Commands (Not Acknowledged)

DRIVE Response	Command	Region	NPA Object no.	Attribute No.	Attribute Message Type		Error Code	Comments
NAK	1	4	0-10	6	Integer	Read Binary Output	11 ¹⁾	Read Interstage on delay attribute associated with each individual point. (JCI use only)
NAK	1	4	0-10	7	Integer	Read Binary Output	11 ¹⁾	Read Interstage off delay attribute associated with each individual point. (JCI use only)
NAK	2	4	0-10	2	Byte	Write Binary Output	11 ¹⁾	Object Status not writeable
NAK	2	4	0-10	6	Integer	Write Binary Output	11 ¹⁾	Write Interstage on delay attribute associated with each individual point. (JCI use only)
NAK	2	4	0-10	7	Integer	Write Binary Output	11 ¹⁾	Write Interstage off delay attribute associated with each individual point. (JCI use only)

¹⁾ Error code 11 is used because attributes are considered as fields/records in the point map database.

Table 2.8: No Subcommand column in this table.



2.1.15 Internal Integers (ADI) Commands (Acknowledged)

DRIVE Response	Command	Subcommand	Region	NPA Object no.	Attribute No.	Attribute Message Type		Comments
ACK	1	-	6	0-254	1	Integer	Read Internal Parameter of object type integer (16 bit)	Read Object Status associated with each individual point
ACK	1	-	6	0-254	2	Integer	Read Internal Parameter of object type integer (16bit)	Read Current Value attribute associated with each individual point
ACK	2	-	6	0-254	-	Integer	Write Internal Parameter of object type integer (16bit)	Write to Current Value attribute associated with each individual point
ACK	7	2	6	0-254	-	Integer	Override Internal Parameter of object type Integer (16 bit)	Write to internal parameter current value (set-up parameters for Drive)
ACK	7	3	6	0-254	-	-	Override Release	Set the current value, the value that it was before the 1. Override Command was issued

Table 2.9: No Error Code column in this table.

2.1.16 Internal Floating Point Commands (Acknowledged)

DRIVE Response	Command	Subcommand	Region	NPA Object no.	Attribute No.	Attribute Message Type		Comments
ACK	1	-	5	0-101	1	Byte	Read Internal Parameter of object type float	Read Object Status associated with each individual point
ACK	1	-	5	0-101	2	Float	Read Internal Parameter of object type float	Read Current Value attribute associated with each individual point
ACK	2	-	5	0-101	-	Float	Write Internal Parameter of object type float	Write to Current Value attribute associated with each individual point
ACK	2	-	5	0-101	-	Float	Write Internal Parameter of object type float	Write to Current Value attribute associated with each individual point
ACK	7	2	5	0-101	-	Float	Override Internal Parameter of object type float	Write to internal parameter current value (set-up parameters for Drive)
ACK	7	3	5	0-101	-	-	Override Release	Set the current value, the value that it was before the 1. Override Command was issued

Table 2.10: No Error Code column in this table.



2.2.1 Start-up of the Frequency Converter

Use the frequency converter keypad mounted either on the drive or remote. Use the Extended Menu key to access the O-## group parameters (Options / Comms). The settings shown below are typical. Some settings may be changed to meet the application requirements. The settings below will serve as a good starting reference. Refer to the operating instruction manual for instructions on changing parameters and programming the drive.

Examples of typical settings. Program the following:

Parameter:	Setting:
par. O-30 Protocol	[3] Metasys N2
par. O-31 Address	1 (Default)
par. O-32 Drive Port Baud Rate	[2] 9600 Baud (fixed at 9600 for N2 protocol)
par. O-50 Coasting Select	[3] Logic OR
par. O-52 DC Brake Select	[3] Logic OR
par. O-53 Start Select	[3] Logic OR
par. O-54 Reversing Select	[0] Digital input
par. O-55 Set-up Select	[3] Logic OR
par. O-56 Preset Reference Select	[3] Logic OR
par. O-94 Bus Feedback 1	0
par. O-95 Bus Feedback 2	0

NB!

Send an F command to begin communications between the master and the drive!

Example 1:

F command	Setting:
Device address	XX
Char1 command	F
Checksum	YY

Message code:

>XXFYY <CR>

Issue a run command through the master, to the device:

Example 2:

Network start, BO override command:	Setting:
Device address	XX
Char1 command	7
Char1 subcommand	2
Char2 region	04
Char2 object number (NPA)	04 (Start)
Char2 override value	01 (Active)
Checksum	YY

Message code:

>XX72040401YY <CR>

Issue a frequency reference through the master, to the device:

**Example 3:**

Over-ride analog output, speed (50%) change command:	Setting:
Device address	XX
Char1 command	7
Char1 subcommand	2
Char2 region	03
Char2 object number (NPA)	00
Char8 override value *	4E 00 00 00 override value = 50% speed (IEEE floating point, format)
Checksum	YY

Message code:

>XX7203004E000000<CR>

To calculate override value for speed: refer to Scaling of Network Reference and Network Feedback. Issue an override release command through the master to the device:

Example 4:

Bus stop, BO over-ride release command:	Setting:
Device address	XX
Char1 command	7
Char1 subcommand	2
Char2 region	04
Char2 object number (NPA)	04 (Start)
Char8 override value *	00 (Not active)
Checksum	Y

Message code:

>XX72040400YY <CR>

If the preceding commands were issued, the drive should have accelerated to 50% after the speed reference was issued. After the override release, the drive should have stopped.

2.2.2 Scaling of Bus Reference and Feedback

Reference/feedback	Scaling	Float	IEEX hex
20%	$20 * 16384/100$	3276.8	454C CCCC
50%	$50 * 16384/100$	8192	4600 0000
100%	$100 * 16384/100$	16384	4680 0000
200%	$200 * 16384/100$	32767	46FF FE00
-100%	$-100 * 16384/100$	-16384	C680 0000
-200%	$-200 * 16384/100$	-32768	C700 0000

Table 2.11: Reference/feedback values

The reference/feedback value is the percentage of the range of parameter F-52 and F-53. Values within the ranges 100% to 200% and -200% to -100% applies only to the reference. The Float representation of the value 200% must be limited to maximum 32767 and minimum -32768.



2.2.3 Status Update Request

A Status Update Request will cause the drive to report its current operating status. The status codes, descriptions and associated alarms are shown in the chart below.

2

The Device Status Code consists of two parts. The Least Significant Byte, (LSB) of the hex number is the Alarm Number. The Most Significant Byte (MSB) indicates if the alarm is a normal trip (01) that can be reset automatically or manually, or if the alarm is a trip lock (02) requiring cycling power to the drive.

Status codes with associated alarms and descriptions

Device Status Code1	Alarm No.	Description
0x0000	-	Device OK
0x0102	2	Live zero error
0x0204	4	Phase fault (Trip lock)
0x0107	7	Over voltage
0x0108	8	Under voltage
0x0109	9	Inverter overloaded
0x010A	10	Motor overloaded
0x010B	11	Motor thermistor
0x010C	12	Current limit
0x020D	13	Over current (Trip lock)
0x020E	14	Earth fault (Trip lock)
0x020F	15	Switch mode fault (Trip lock)
0x0210	16	Short circuit (Trip lock)
0x0111	17	Standard bus time out
0x0112	18	HPFB time out
0x0116	22	Auto optimization not OK
0x021D	29	Heat sink temperature to high (Trip lock)
0x011E	30	Motor phase U missing
0x011F	31	Motor phase V missing
0x0120	32	Motor phase W missing
0x0122	34	Profibus communication error
0x0225	37	Inverter fault (Trip lock)
0x013C	60	Safety interlock
0x0263	99	Unknown fault (Trip lock)

Read / Write Notes

A write command to an ADF (Internal Floating Point) or BD (Internal Byte) point type will be stored in the drive's EEPROM.

NB!

If write command is issued to an overridden point, the new value will not be stored in the drive's EEPROM.



2.2.4 Override/Override Release Commands and Time Out, O-04 (Setting [20], N2 Override release)

The way the overridden points are released is very important to the way the drive will behave during the override release time out or for release commands issued by the N2 master. This is due to the fact that the active setup can be changed to a different setup. If one would release the active setup before the values that have been overridden in that setup, the backup values would then be restored to the wrong setup, leaving the overridden values in the old setup unchanged.

2

The release after override time out:

During an override release time-out, all points which are overridden, will be released in the order, which they are specified in Appendix POINTMAP:

1. Release Analog Outputs from point address (NPA) 0 to 255.
2. Release Binary Outputs from point address (NPA) 0 to 255.
3. Release Internal Floating Points from point address (NPA) 0 to 255.
4. Release Internal Integer Points from point address (NPA) 0 to 255.
5. Release Internal Byte points from point address (NPA) 0 to 255.

2.2.5 Change of State (COS)/POLLING

A change of state occurs when a new command has been issued for the drive. This command can be issued through the bus or through a drive related status change or command. The master can issue a series of poll commands to the network devices to get an update on any status changes from the time of the last polling. When polling a frequency converter for the first time after a network has been powered up after an F command has been issued, a 0/4 poll command must be issued.

2.2.6 Handling of Poll Message Commands

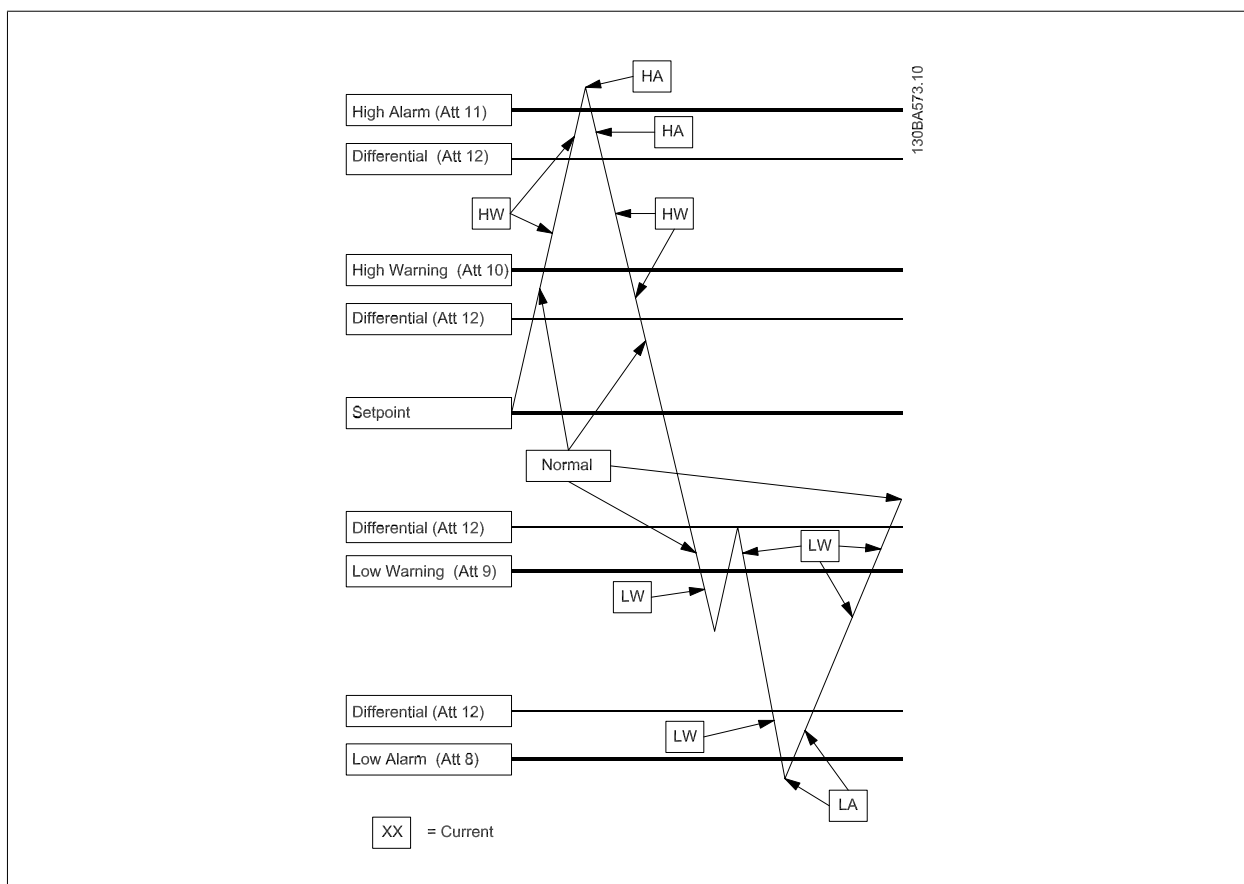
The Identity Command will cause the drive to report all AI, AO, BI and BO points, which are available when the next Poll (0/4) is received. The drive also supports COS for AI and BI point types. The drive is limited to responding with up to 200 ASCII characters, so multiple messages may need to be sent before all available points have been reported.

Upon receiving the Poll (0/4), the frequency converter will begin exporting the requested information. The frequency converter will continue to export new information upon receiving the 0/5 Poll until it has sent all requested information. Then it will respond to a new 0/5 Poll with an ACK response to indicate all information has been transmitted and complete the Poll sequence receiving a 0/4 Poll before sending the ACK response will cause the frequency converter to re-transmit its latest response.



The drawing below illustrates the AI COS handling.

2



For AI:

Alarm Enable or Warning Enable must be set in the Object Configuration Attribute (Attribute 1). Low/High Alarm limits (Attribute 8, 11) or Low/High Warning limits (Attribute 9, 10) must be programmed. Differential Value (Attribute 12) must also be programmed.

For BI:

Alarm Enable must be set in the Object Configuration Attribute (Attribute 1).

Normal state must be programmed in the Object Configuration Attribute (Attribute 1)

Att XX = Attribute number, HA = High alarm, LA = Low alarm, HW = High Warning, LW = Low Warning

The AI COS alarms will only be cleared when the point value goes below the high alarm/warning or above the low alarm/warning limit by more than the programmed differential value (Attribute 12).

The BI COS will set the Alarm (Object Status bit 4) if COS enabled (Object Configuration Bit 0) is set, Alarm Enabled (Object configuration bit 3) is set, and Current State (Object Status bit 6) is different from Normal State (Object Configuration bit 1).



3 Appendix

3.1.1 Analog Inputs (AI)

NPA	Unit	Description	Range	AF-600 FP Par. Number
0	%	Reference [%]	-	DR-02
1	-	Reference [Unit]	-	DR-01
2	-	Feedback	-	DR-52
3	Hz	Frequency	-	DR-13
4	-	User defined readout	-	DR-09
5	A	Current	-	DR-14
6	kW	Power	-	DR-10
7	hp	Power	-	DR-11
8	V	Output Voltage	-	DR-12
9	V	DC Voltage	-	DR-30
10	%	Motor Thermal Protection	-	DR-18
11	%	Inverter Thermal Protection	-	DR-35
12	V	Terminal 53 analog	-	DR-62
13	V	Terminal 54 analog	-	DR-64
16	%	External reference	-	DR-50
17	C	Heat sink temperature	-	DR-34
18	Hour	Operating hours	-	ID-00
19	Hour	Running hours	-	ID-01
20	kWh	kWh counter	-	ID-02
21	-	Power-ups	-	ID-03
22	-	Over temps	-	ID-04
23	-	Over voltages	-	ID-05
24	-	Start Ups	-	ID-08
25	-	Torque [%]	-	DR-22
26	-	Speed [rpm]	-	DR-17
27	-	Analog Input, GPIO X30/11	-	DR-75
28	-	Analog Input, GPIO X30/12	-	DR-76
29	-	Analog Input, IO option X42/1	-20.000 to +20.000	LG-20
30	-	Analog Input, IO option X42/3	-20.000 to +20.000	LG-21
31	-	Analog Input, IO option X42/5	-20.000 to +20.000	LG-22
32	-	Analog Out X42/7	-	LG-33
33	-	Analog Out X42/9	-	LG-34
34	-	Analog Out X42/11	-	LG-35
45	-	Feedback 1 [Unit]	-	DR-54
46	-	Feedback 2 [Unit]	-	DR-55
47	-	Feedback 3 [Unit]	-	DR-56
48	-	Ext. 1 Feedback [Unit]	-	XC-18
49	-	Ext. 2 Feedback [Unit]	-	XC-38

The default values are shown in bold on the following pages. Any point not listed on the following pages is reserved for future use.

Some Metasys software uses an object number range from 0 to 255, other Metasys software uses the range 1 to 254. The latter software will interpret object number 0 as 1, and 1 as 2, etc. To access the proper point with this Metasys software, add 1 to the NPA number in the tables.



3.1.2 Binary Inputs (BI)

3

NPA	Unit	Description	Range	AF-600 FP Par. Number
0	15	Timers Status	0=OK, 1=Limit	Par. DR-03 Status Word
1	14	Current Status	0=OK, 1=Limit	
2	13	Voltage Status	0=OK, 1=Limit	
3	12	Inverter Status	0=OK, 1=Stall, Auto-start	
4	11	Running Status	0=Not Running, 1=Running	
5	10	Frequency Status	0=Out of Range, 1=In Range	
6	9	Control Status	0=Local, 1= Bus	
7	8	Reference Status	0=Not on Ref., 1=On Ref.	
8	7	Warning Status	0=No Warning , 1= Warning	
9	3	Tripped Status	0=No Trip , 1=Tripped	
10	2	Drive Enabled Status	0=Not Enabled , 1=Enabled	
11	1	Drive Ready Status	0=Not Ready, 1=Ready	
12	0	Drive Controller Status	0=Not Ready, 1=Ready	
16	31	Auto tune		Par. DR-92 Warning Word
17	30	Auto tune		
18	29	Auto tune		
19	28	Auto tune		
20	27	Voltage Limit	0=OK, 1=Warning	
21	26	Low Temperature	0=OK, 1=Warning	
22	25	Current Limit	0=OK, 1=Warning	
23	24	Mains Failure	0=OK, 1=Warning	
24	23	24V Supply Low	0=OK, 1=Warning	
25	22	Fieldbus Fault	0=OK, 1=Warning	
26	21	Speed Limit	0=OK, 1=Warning	
27	20	Brake IGBT	0=OK, 1=Warning	
28	19	Brake Resistor	0=OK , 1=Warning	
29	18	Brake Overload	0=OK, 1=Warning	
30	17	10V low	0=OK, 1=Warning	
31	16	Live Zero Error	0=OK, 1=Warning	
32	15	No Motor	0=OK, 1=Warning	
33	14	Mains Phase Loss	0=OK, 1=Warning	
34	13	DC Voltage High	0=OK, 1=Warning	
35	12	DC Voltage Low	0=OK, 1=Warning	
36	11	DC Overvoltage	0=OK, 1=Warning	
37	10	DC Undervoltage	0=OK, 1=Warning	
38	9	Inverter Overload	0=OK, 1=Warning	
39	8	Motor ETR Overload	0=OK, 1=Warning	
40	7	Motor Thermal Overload	0=OK, 1=Warning	
41	6	Torque Limit	0=OK, 1=Warning	
42	5	Over Current	0=OK, 1=Warning	
43	4	Ctrl. Word Timeout	0=OK, 1=Warning	
44	3	Ctrl. Card Temp.	0=OK, 1=Warning	
45	2	Earth Fault	0=OK, 1=Warning	
46	1	Pwr. Card Temp	0=OK,1=Warning	



Binary Inputs (BI), continued..

NPA	Unit	Description	Range	AF-600 FP Par. Number
48	31	Reserved		Par. DR-90 Alarm Word
49	30	Reserved		
50	29	Drive Initialized	0=OK, 1=Alarm	
51	28	Option Change	0=OK, 1=Alarm	
52	27	Brake IGBT	0=OK, 1=Alarm	
53	26	Brake Resistor	0=OK, 1=Alarm	
54	25	1.8V Supply Low	0=OK, 1=Alarm	
55	24	Mains Failure	0=OK, 1=Alarm	
56	23	24V Supply Low	0=OK, 1=Alarm	
57	22	Fieldbus Fault	0=OK, 1=Alarm	
58	21	W Phase Loss	0=OK, 1=Alarm	
59	20	V Phase Loss	0=OK, 1=Alarm	
60	19	U Phase Loss	0=OK, 1=Alarm	
61	18	Brake Overload	0=OK, 1=Alarm	
62	17	Internal Fault	0=OK, 1=Alarm	
63	16	Live Zero Error	0=OK, 1=Alarm	
64	15	AMA not ok	0=OK, 1=Alarm	
65	14	Mains Phase Loss	0=OK, 1=Alarm	
66	13	Inrush Fault	0=OK, 1=Alarm	
67	12	Short Circuit	0=OK, 1=Alarm	
68	11	DC Overvoltage	0=OK, 1=Alarm	
69	10	DC Undervoltage	0=OK, 1=Alarm	
70	9	Inverter Overload	0=OK, 1=Alarm	
71	8	Motor ETR Overload	0=Trip, 1=Trip lock	
72	7	Motor Thermal Overload	0=OK, 1=Alarm	
73	6	Torque Limit	0=OK, 1=Alarm	
74	5	Over Current	0=OK, 1=Alarm	
75	4	Ctrl. Word Timeout	0=OK, 1=Alarm	
76	3	Ctrl. Card Temp	0=OK, 1=Alarm	
77	2	Earth Fault	0=OK, 1=Alarm	
78	1	Pwr. Card Temp	0=OK, 1=Alarm	
83	28		0=FALSE, 1=TRUE	Par. DR-94 Ext. Status Word
84	27		0=FALSE, 1=TRUE	
85	26		0=FALSE, 1=TRUE	
86	25		0=FALSE, 1=TRUE	
87	24		0=FALSE, 1=TRUE	
88	23		0=FALSE, 1=TRUE	
89	22		0=FALSE, 1=TRUE	
90	21		0=FALSE, 1=TRUE	
91	20		0=FALSE, 1=TRUE	
92	19		0=FALSE, 1=TRUE	
93	18		0=FALSE, 1=TRUE	
94	17		0=FALSE, 1=TRUE	
95	16		0=FALSE, 1=TRUE	
96	15	OVC Active	0=FALSE, 1=TRUE	
97	14	Out of Speed Range	0=Auto mode, 1=Hand mode	



Binary Inputs (BI), continued..

NPA	Unit	Description	Selection	AF-600 FP Par. Number
98	13	Braking	0=FALSE, 1=TRUE	Par. DR-94 Ext. Status Word
99	12	Braking Max	0=Remote ref., 1=Local ref.	
100	11	Brake Check Ok	0=FALSE, 1=TRUE	
101	10	Output Frequency Low	0=FALSE, 1=TRUE	
102	9	Output Frequency High	0=FALSE, 1=TRUE	
103	8	Output Current Low	0=FALSE, 1=TRUE	
104	7	Output Current High	0=FALSE, 1=TRUE	
105	6	Feedback Low	0=FALSE, 1=TRUE	
106	5	Feedback High	0=FALSE, 1=TRUE	
107	4	Catch Up	0=FALSE, 1=TRUE	
108	3	Slow Down	0=FALSE, 1=TRUE	
109	2	Start CW/CCW	0=FALSE, 1=TRUE	
110	1	AMA Running	0=FALSE, 1=TRUE	
111	0	Ramping	0=FALSE, 1=TRUE	Par. DR-00 Control Word
112	9	Ramp	0=RAMP 1, 1=RAMP 2	
113	15	Reverse	0=No function, 1=reverse	
114	14	Setup MSB	0=FALSE, 1=TRUE	
115	13	Setup LSB	0=FALSE, 1=TRUE	
116	12	Relay02	0=Relay04 off, 1=Relay04 on	
117	11	Relay01	0=Relay01 off, 1=Relay01 on	
118	10	Res., always 0 (data valid)	0=FALSE	
119	8	Jog	0=No Function, 1=Jog	
120	7	Reset	0=No Function, 1=Reset	
121	6	Start	0=start, 1=stop	
122	5	Freeze Output	0=Freeze output, 1=Ramping	
123	4	Q-stop	0=Q-stop, 1=Ramping	Par. DR-60 Digital Input
124	3	Coast	0=Coasting, 1=no Coast	
125	2	DC Brake	0=DC Brake, 1=Ramp stop	
126	1	Preset ref. MSB	0=FALSE, 1=TRUE	
127	0	Preset ref. LSB	0=FALSE, 1=TRUE	
128	0	Terminal 33	0=FALSE, 1=TRUE	
129	1	Terminal 32	0=FALSE, 1=TRUE	
130	2	Terminal 29	0=FALSE, 1=TRUE	
131	3	Terminal 27	0=FALSE, 1=TRUE	
132	4	Terminal 19	0=FALSE, 1=TRUE	
133	5	Terminal 18	0=FALSE, 1=TRUE	
134	6	GPIO Term X30/2	0=FALSE, 1=TRUE	
135	7	GPIO Term X30/3	0=FALSE, 1=TRUE	
136	8	GPIO Terminal X30/4	0=FALSE, 1=TRUE	



3.1.3 Analog Outputs (AO)

NPT	NPA	UNIT	DESCRIPTION	RANGED	PAR. NUMBER
AO	0	%	Bus reference ¹	-200 to 200 Proportionally mapped into the range -32768 to 32767	-
AO	1		Bus feedback 1	Please refer to [4]	O-94
AO	2		Bus feedback 2	Please refer to [4]	O-95
AO	3		Bus feedback 3	Please refer to [4]	O-96
AO	4		Analog Output Term 42		AN-53
AO	5		Pulse Output Term 27		E-93
AO	6		Pulse Output Term 29		E-95
AO	7		GPIO Analog Output Terminal X30/8		AN-63
AO	8		Analog Option Output Terminal X42/7		AO-53
AO	9		Analog Option Output Terminal X42/9		AO-63
AO	10		Analog Option Output Terminal X42/11		AO-60

¹⁾ Please refer to scaling of Bus Reference and Feedback, Section on Scaling or Bus Reference and Feedbacks.



3.1.4 Internal Integers (ADI)

3

NPA	Unit	Description	Range	Par. Number
0	-	Language Selection		K-01
1	-	Setup Copy Function		K-51
2	-	Custom Readout Unit		K-30
3	-	Large Readout		K-23
4	-	Small Readout 1		K-20
5	-	Small Readout 2		K-21
6	-	Small Readout 3		K-22
7	-	Unit of Local Reference		K-05
8	-	Hand Start Button		K-40
9	-	Off/Stop Button		K-41
10	-	Auto Start Button		K-42
11	-	Reset Button		K-43
13	-	Operating State at Power Up		K-04
21	-	Torque Characteristics		H-43
23	-	Motor Preheat		B-00
24	-	Motor Thermal Protection		F-10
31	-	Reference Site		F-02
32	-	Over Volt Control		B-17
33	-	Reference Function		F-54
40	-	Digital Input 18		E-01
41	-	Digital Input 19		E-02
42	-	Digital Input 27		E-03
43	-	Digital Input 29		E-04
44	-	Digital Input 32		E-05
45	-	Digital Input 33		E-06
51	Sec	Live Zero Time Out		AN-00
52	-	Live Zero Function		AN-01
53	-	Signal Output 42		AN-50
55	-	CC Relay 1 Function	0 to 255	E-24:0
56	-	CC Relay 2 Function	0 to 255	E-24:1
57	-	Option B Relay 1 Function	0 to 255	E-24:6
58	-	Option B Relay 2 Function	0 to 255	E-24:7
59	-	Option B Relay 3 Function	0 to 255	E-24:8
60	-	Reset Function		H-04
61	-	Flying Start		H-09
62	-	Noise Reduction Method		F-27
63	-	Broken Belt Function		AP-60



3.1.5 Internal Floating Point (ADF)

NPT	NPA	UNIT	DESCRIPTION	RANGE	PAR. NUMBER
ADF	0	-	Max valuer of custom readout	Please refer to	K-30
ADF	10	kW	Motor power		P-07
ADF	11	V	Motor voltage		F-05
ADF	12	Hz	Motor frequency		F-04
ADF	13	A	Motor Current(IM.N)		P-03 (mAmp)
ADF	14	RPM	Motor nom. Speed		P-06
ADF	16	%	Resonance damping		H-64
ADF	18	Sec	Start delay		F-24 (mSecI)
ADF	19	%	Preheat DC-current		B-00
ADF	20	%	DC brake current		B-01
ADF	21	Sec	DC braking time		B-02
ADF	22	Hz	DC brake cut-in frequency		B-04
ADF	30	Hz	Output freq. low limit(FMIN)		F-16
ADF	31	Hz	Output freq. high limit(FMAX)		F-03
ADF	32	Unit	Min reference (RefMIN)		F-52
ADF	33	Unit	Max. reference (RefMAX)		F-53
ADF	34	Sec	Accel Time		F-07
ADF	35	Sec	Decel Time		F-08
ADF	36	Hz	Jog Frequency		C-20
ADF	37	%	Digital Reference 1		C-05:0
ADF	38	%	Digital Reference 2		C-05:1
ADF	39	%	Digital Reference 3		C-05:2
ADF	40	%	Digital Reference 4		C-05:3
ADF	41	A	Current Limit		H-71
ADF	42	Hz	Frequency bypass bandwidth		C-01:0
ADF	43	Hz	Frequency 1 Bypass		C-04:0
ADF	44	Hz	Frequency 2 Bypass		C-01:1
ADF	45	Hz	Frequency 3 Bypass		C-04:1
ADF	46	Hz	Frequency 4 Bypass		C-01:2
ADF	47	A	Warning Current Low(ILOW)		C-04:2
ADF	48	A	Warning Current High(IHIGH)		C-01:3
ADF	49	Hz	Warning Freq. Low(FLOW)		C-04:3



Internal Floating Point (ADF), continued..

NPT	NPA	UNIT	DESCRIPTION	RANGE	PAR. NUMBER
ADF	50	A	Warning Current Low(I _{LOW})		H-70
ADF	51	A	Warning Current High (I _{HIGH})		H-71
ADF	52	Hz	Warning Freq. Low(F _{LOW})		H-72
ADF	53	Hz	Warning Freq. High(F _{HIGH})		H-73
ADF	54	Unit	Warning Low Ref.(Ref _{LOW})		H-74
ADF	55	Unit	Warning High Ref.(Ref _{HIGH})		H-55
ADF	56	Unit	Warning Low FB.(FB _{LOW})		H-56
ADF	57	Unit	Warning High FB.(FB _{HIGH})		H-57
ADF	60	Unit	Warning High Ref.(Ref _{HIGH})		AN-10
ADF	61	Unit	Warning Low FB.(FB _{LOW})		AN-11
ADF	62	Unit	Warning High FB.(FB _{HIGH})		AN-12
ADF	63	V	Terminal 53 min. scale V		AN-13
ADF	64	V	Terminal 53 max. scale V		AN-20
ADF	65	V	Terminal 54 min. scale V		AN-21
ADF	66	V	Terminal 54 max. scale V		AN-22
ADF	67	A	Terminal 54 min. scale mA		AN-23
ADF	68	Hz	Terminal 42 output puls scale		E-71
ADF	69	Hz	Terminal 45 output puls scale		E-74
ADF	70	mSec	CC Relay 1 ON Delay		E-26:0
ADF	71	mSec	CC Relay 1 ON Delay	0.01 to 600.00	E-27:0
ADF	72	mSec	CC Relay 1 ON Delay	0.01 to 600.00	E-26:1
ADF	73	Sec	CC Relay 1 ON Delay	0.01 to 600.00	E-27:1
ADF	80	Sec	No Flow Timer		AP-24
ADF	81	Sec	Dry Pump Timer		AP-27
ADF	82	Sec	Minimum Run Time		AP-40
ADF	83	Hz	Minimum Sleep Time		AP-41
ADF	84	%	Boost setpoint		AP-45
ADF	85	Hz	Wake-up Speed		AP-43
ADF	86	Sec	Minimum Boost Time		AP-46
ADF	87	kHz	Switch Frequency		F-26
ADF	88	Unit	Set point 1		CL-21
ADF	89	Unit	Set point 2		CL-22
ADF	90	Hz	PID Start Frequency		CL-83
ADF	91	-	PID Proportional Gain		CL-93
ADF	92	Sec	PID Integration Time		CL-94
ADF	93	Sec	PID Differentiation Time		CL-95
ADF	94	-	PID D-gain Limit		CL-96
ADF	95	Unit	Set Point 3		CL-23



Internal Floating Point (ADF), continued..

NPT	NPA	UNIT	DESCRIPTION	RANGE	PARAMETER NUMBER
ADF	100	-	Control Timeout Function		O-04
ADF	101	-	Control Timeout Time		O-03
ADF	110	Sec	Option B Relay 1 ON Delay	0.01 to 600.00	E-26:6
ADF	111	Sec	Option B Relay 1 OFF Delay	0.01 to 600.00	E-27:6
ADF	112	Sec	Option B Relay 2 ON Delay	0.01 to 600.00	E-26:7
ADF	113	Sec	Option B Relay 2 OFF Delay	0.01 to 600.00	E-27:7
ADF	114	Sec	Option B Relay 3 ON Delay	0.01 to 600.00	E-26:8
ADF	115	Sec	Option B Relay 3 OFF Delay	0.01 to 600.00	E-27:8
ADF	120	V	Analogue Input X30/11 Low Voltage	0.07 to 10.00	AN-30
ADF	121	V	Analogue Input X30/1 High Voltage	0.07 to 10.00	AN-31
ADF	122	V	Analogue Input X30/12 Low Voltage	0.07 to 10.00	AN-40
ADF	123	V	Analogue Input X30/12 High Voltage	0.07 to 10.00	AN-41
ADF	124	V	Analogue Input X42/1 Low Voltage	0.07 to 10.00	AO-10
ADF	125	V	Analogue Input X42/1 High Voltage	0.07 to 10.00	AO-11
ADF	126	V	Analogue Input X42/3 Low Voltage	0.07 to 10.00	AO-20
ADF	127	V	Analogue Input X42/3 High Voltage	0.07 to 10.00	AO-21
ADF	128	V	Analogue Input X42/5 Low Voltage	0.07 to 10.00	AO-30
ADF	129	V	Analogue Input X42/5 High Voltage	0.07 to 10.00	AO-31
ADF	130	%	Analogue Output 42 Timeout Preset		AN-54
ADF	131	%	Analogue Output X30/8 Timeout Preset		AN-64
ADF	132	%	Analogue Output X42/7 Timeout Preset	0.00 to 100.00	AO-54
ADF	133	%	Analogue Output X42/9 Timeout Preset	0.00 to 100.00	AO-64
ADF	134	%	Analogue Output X42/11 Timeout Preset	0.00 to 100.00	AO-74

¹ "Feedback" if closed loop - and "100 Hz" if open loop

² Unit is power dependent

³ The drive must be stopped to change this point

⁴ The point is global in all 4 setups

⁵ Not available in all units.



3.1.6 Internal Integers (ADI)

3

NPT	NPA	UNIT	DESCRIPTION	RANGE	PAR. NUMBER
ADI	0	-	Language Selection		K-01
ADI	1	-	Setup Copy Function		K-51
ADI	2	-	Custom Readout Unit		K-30
ADI	3	-	Large Readout		K-23
ADI	4	-	Small Readout 1		K-20
ADI	5	-	Small Readout 2		K-21
ADI	6	-	Small Readout 3		K-22
ADI	7	-	Unit of Local Reference		K-05
ADI	8	-	Hand Start Button		K-40
ADI	9	-	Off/Stop Button		K-41
ADI	10	-	Auto Start Button		K-42
ADI	11	-	Reset Button		K-43
ADI	13	-	Operating State at Power Up		K-04
ADI	20	-	Configuration Mode		H-40
ADI	21	-	Torque Characteristics		H-43
ADI	22	-	Auto Tune		P-04
ADI	23	-	Motor Preheat		B-00
ADI	24	-	Motor Thermal Protection		F-10
ADI	31	-	Reference Site		F-02
ADI	32	-	Over Volt Control		B-17
ADI	33	-	Reference Function		F-54
ADI	40	-	Digital Input 18		E-01
ADI	41	-	Digital Input 19		E-02
ADI	42	-	Digital Input 27		E-03
ADI	43	-	Digital Input 29		E-04
ADI	44	-	Digital Input 32		E-05
ADI	45	-	Digital Input 33		E-06
ADI	46	-	Reference 1 Source		F-01
ADI	47	-	Feedback 1 Source		CL-00
ADI	48	-	Feedback 2 Source		CL-03
ADI	51	Sec	Live Zero Time Out		AN-00
ADI	52	-	Live Zero Function		AN-01
ADI	53	-	Signal Output 42		AN-50
ADI	55	-	CC Relay 1 Function	0 to 255	E-24:0
ADI	56	-	CC Relay 2 Function	0 to 255	E-24:1
ADI	57	-	Option B Relay 1 Function	0 to 255	E-24:6
ADI	58	-	Option B Relay 2 Function	0 to 255	E-24:7
ADI	59	-	Option B Relay 3 Function	0 to 255	E-24:8
ADI	60	-	Reset Function		H-04
ADI	61	-	Flying Start		H-09
ADI	62	-	Noise Reduction Method		F-27
ADI	63	-	Broken Belt Function		AP-60



Internal Integers (ADI), continued..

NPT	NPA	UNIT	DESCRIPTION	RANGE	PARAMETER NUMBER
ADI	64	Sec	Trip Delay on Overload		SP-25
ADI	68	-	PID Normal/Inverse		CL-81
ADI	69	-	PID Anti Windup		CL-91
ADI	70	-	Feedback 1 Conversion		CL-01
ADI	71	-	Feedback 1 Source Unit		CL-02
ADI	72	-	Feedback 2 Conversion		CL-04
ADI	73	-	Feedback 2 Source Unit		CL-05
ADI	74	-	Reference/Feedback Unit		CL-12
ADI	75	-	Two Feedback Calculation		CL-20
ADI	80	-	Coasting		O-50
ADI	81	-	DC Brake		O-52
ADI	82	-	Start		O-53
ADI	83	-	Reversing		O-54
ADI	84	-	Selection of Setup		O-55
ADI	85	-	Selection of Speed		O-56
ADI	90	-	Reset kWh Counter		ID-06
ADI	91	-	Reset Running Hours Counter		ID-07
ADI	92	-	Operation Mode		H-03
ADI	101	-	Analogue Input X42/1 Mode	0 to 3	AO-00
ADI	102	-	Analogue Input X42/3 Mode	0 to 3	AO-01
ADI	103	-	Analogue Input X42/5 Mode	0 to 3	AO-02
ADI	104	-	Analogue Input X30/8 Mode		AN-60
ADI	105	-	Analogue Input X42/7 mode	0 to 145	AO-50
ADI	106	-	Analogue Input X42/9 Mode		AO-60
ADI	107	-	Analogue Input X42/11 Mode		AO-70
		-	ECB Bypass Mode		BP-00
ADI	111	-	ECB Bypass Start Timer Delay		BP-01
ADI	112	-	ECB Bypass Trip Bypass Delay		BP-02
ADI	120	-	Dry Pump Function		AP-26
ADI	121	-	Broken Belt Action		AP-60
ADI	122	%	Broken Belt Torque		AP-61
ADI	123	sec	Broken Belt Timer		AP-62
ADI	124	sec	Interval Between Starts		AP-76
ADI	125	sec	Minimum Run Time		AP-77
ADI	254	-	Active Setup	[4]	

³ Drive must be stopped to change this point⁴The point is global in all 4 setups

The instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the GE company.

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