

Altivar 212

Variable speed drives
for asynchronous motors

APOGEE[®] FLN P1 communication manual

01/2011



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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

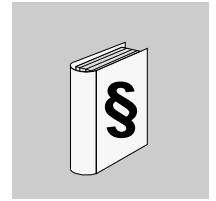
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Table of Contents



	Safety Information	5
	About the Book	6
Chapter 1	Introduction	9
Chapter 2	Hardware	11
	Hardware description	12
	Use of open Style Connector	12
	Description of terminals	13
Chapter 3	Connecting to the bus	15
	Cable routing practices	16
	Connector pinout	17
Chapter 4	Configuration	19
	Communication parameters	20
Chapter 5	Network objects	23
	Logical Analog Input (LAI) Summary	26
	Logical Analog Output (LAO) Summary	27
	Logical Digital Input (LDI) Summary	28
	Logical Digital Output (LDO) Summary	30
	Message box Function Points	32
	FLN P1 Detected error Codes	33
Chapter 6	Diagnostics	35
	Communication detected faults	36
	LED indicators	37
	Detected fault possible causes and remedies	38
Chapter 7	Reports	39

Safety Information



Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety message that follow this symbol to avoid possible injury or death.

▲ DANGER

DANGER indicates an imminently hazardous situation, which, if not avoided, **will result** in death or serious injury.

▲ WARNING

WARNING indicates a potentially hazardous situation, which, if not avoided, **can result** in death, serious injury or equipment damage.

▲ CAUTION

CAUTION indicates a potentially hazardous situation, which, if not avoided, **can result** in injury or equipment damage.

CAUTION

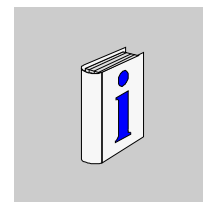
CAUTION, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, **can result** in equipment damage.

PLEASE NOTE

The word “drive” as used in this manual refers to the controller portion of the adjustable speed drive as defined by NEC.

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

About the Book



At a Glance

Document Scope

The purpose of this document is to show you how to configure the Altivar 212 to use APOGEE® FLN P1 for monitoring and control.

NOTE: Read and understand this document and all related documents (see below) before installing, operating, or maintaining your ATV212.

Validity Note

This documentation is valid for the Altivar 212 APOGEE® FLN P1 fieldbus.

Related Documents

Title of Documentation	Reference Number
ATV212 Quick Start	S1A53825
ATV212 Installation manual	S1A53832
ATV212 Programming manual	S1A53838
ATV212 Modbus manual	S1A53844
ATV212 BACnet manual	S1A53845
ATV212 Metasys N2 manual	S1A53846
ATV212 LonWorks manual	S1A53848
ATV212 other option manuals: see www.schneider-electric.com	

You can download the latest versions of these technical publications and other technical information from our website at www.schneider-electric.com.

Product Related Information

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Read and understand this manual before installing or operating the Altivar 212 drive.
- Any changes made to the parameter settings must be performed by qualified personnel.

Failure to follow these instructions will result in death or serious injury.

Before you begin

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Read and understand this manual before installing or operating the drive. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with all international and national electrical code requirements with respect to grounding of all equipment.
- Many parts of this drive, including the printed circuit boards, operate at the line voltage. **DO NOT TOUCH.** Use only electrically insulated tools.
- **DO NOT** touch unshielded components or terminal strip screw connections with voltage present.
- **DO NOT** short across terminals PA/+ and PC/- or across the DC bus capacitors.
- Before servicing the drive:
 - Disconnect all power, including external control power that may be present.
 - Place a "DO NOT TURN ON" label on all power disconnects.
 - Lock all power disconnects in the open position.
 - **WAIT 15 MINUTES** to allow the DC bus capacitors to discharge.
 - Measure the voltage of the DC bus between the PA/+ and PC/- terminals to ensure that the voltage is less than 42 Vdc.
 - If the DC bus capacitors do not discharge completely, contact your local Schneider Electric representative. Do not repair or operate the drive
- Install and close all covers before applying power or starting and stopping the drive.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

DAMAGE DRIVE EQUIPMENT

Do not operate or install any drive or drive accessory that appears damaged.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link (1).

Failure to follow these instructions can result in death, serious injury, or equipment damage.

(1) For additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems."

Introduction



1

Data exchanges give access to all Altivar 212 functions:

- Control (start, stop, reset, setpoint),
- Monitoring (status, current, voltage, thermal state...),
- Diagnostics (alarms).

The integrated display terminal and the graphic display option can be used to access numerous functions for communication configuration and diagnostics.

Hardware



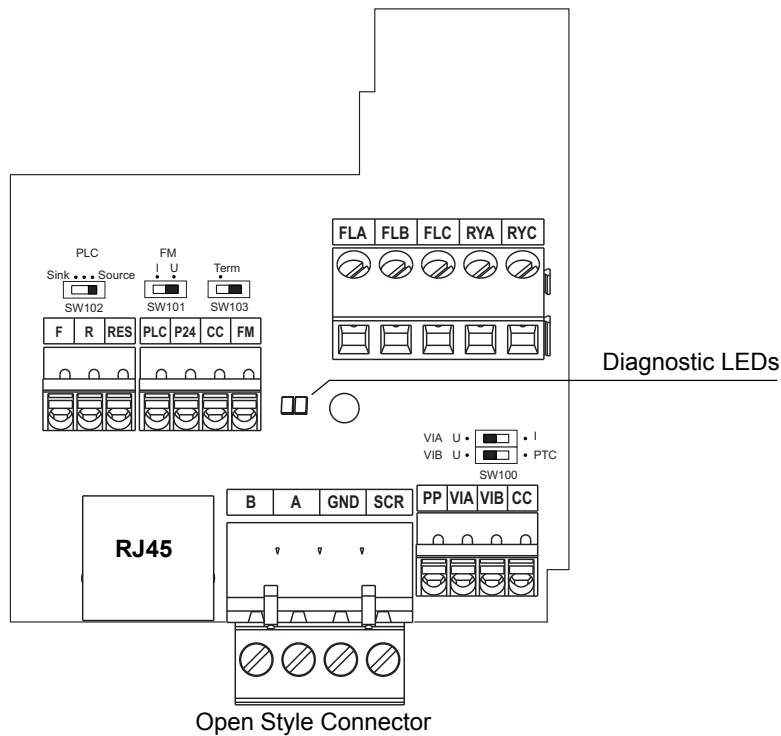
2

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Hardware description	12
Use of open Style Connector	12
Description of terminals	13

Hardware description



Use of open Style Connector

Use the open style connector to connect the drive to APOGEE FLN P1 fieldbus. Full connection details are given in the Connecting to the bus section page [15](#).

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Modify only the setting of the switches when the product is switched off.
- Do not change the setting of the SW102 unless your system is wired for SINK logic.

Failure to follow these instructions will result in death or serious injury.

⚠ CAUTION

RISK OF BODY INJURY

Use a screwdriver to change the position of the switches.

Failure to follow these instructions will result in death or serious injury.

Description of terminals

Terminal symbol	Function	Electrical specifications	Internal circuits
F	Multifunctional programmable logic input. It has forward rotation function in default setting. ON: forward rotation drive OFF: slowdown and stop	Input for voltage-free contact 24 Vdc, 5 mA or less. SINK/SOURCE can be selected with SW102.	
R	Multifunctional programmable logic input. It has Preset speed command input 1 in default setting.		
RES	Multifunctional programmable logic input. It has Fault Reset in default setting		
PP	Voltage supply for reference potentiometer.	Voltage: 10 Vdc Max current: 10 mA Protected against short circuits.	
VIA	Switch-configurable voltage or current analog input using SW100. It has speed setpoint function in the default setting. (0 to 50 Hz frequency with 0 to 10 Vdc in voltage or with 0 to 20 mA in current input). In addition, This analog input is also configurable as a logic input.	Voltage: 10 Vdc Internal impedance: 30 k Ω Current: 0 - 20 mA	
VIB	Multifunction programmable analog input. It has speed setpoint function in the default setting (0 to 50 Hz frequency with 0 to 10 Vdc input). In addition, this terminal can be used as PTC (2) input by setting switch SW100 and the parameters [Mot PTC selection] F 5 4 5 and [PTC resistor value] F 5 4 6.	Voltage: 10 Vdc Internal impedance: 30 k Ω	
CC	Control circuit equipotential terminal	-	
PLC	This terminal is only active when the switch (SINK-SOURCE) is on PLC position. It allow to manage external sink or source with static outputs. PLC shall be connected to 0V (CC terminal) or +24V according to the type of outputs	Max. voltage: 50 Vdc	
P24	24 Vdc power supply output	Voltage: 24 Vdc, 50 mA	
FM	Switch-configurable voltage or current analog output using SW101.	Voltage analog output: 0...10 Vdc Minimum load impedance: 470 Ω Current analog output: 0...20 mA Maximum load impedance: 550 Ω	
FLA FLB FLC RYA RYC	Multifunctional programmable relay contact outputs. Default setting is set to detect the activation of the drive protection function. Contact across FLA-FLC is closed and FLB-FLC is open during normal operation. RYA -RYC is open.	Voltage: 30 Vdc, 0.5 A 250 Vac, 1A ($\cos \varphi = 1$) Voltage: 250 Vac, 0.5A ($\cos \varphi = 0.4$)	

(1) Voltage conversion

(2) PTC (Positive Temperature Coefficient): Resettable thermal fuse resistor for over current protection.

Terminal symbol	Function	Electrical specifications	Internal circuits
B A GND	APOGEE FLN P1 open style connector	RS485 transmission data, reception data.	
SCR	APOGEE FLN P1 communication shield terminal. This terminal is not connected to other circuits in the board. Ground this terminal in a location separated from the ground of the power line.		

Connecting to the bus



3

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Cable routing practices	16
Connector pinout	17

Cable routing practices

Recommendations for wiring the drive to the APOGEE FLN P1 network

Connections	2 wires differential
Maximum devices per segment	32
Maximal cable length	1200 m (3937 ft) For this cable length, baud rate is 19200 bit/s

Install a line terminator at both ends of the line.

Note: A terminating resistor is built into the drive and can be enabled or disabled via the SW103 switch.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION DUE TO IMPROPER WIRING PRACTICES

- Follow the wiring practices described in this document in addition to those already required by the National Electrical Code and local electrical codes.
- Check the power connections before energizing the drive.
- If replacing another drive, verify that all wiring connections to the ATV212 drive comply with all wiring instructions in this manual.

Failure to follow these instructions will result in death or serious injury.

When wiring Altivar 212 drives to an APOGEE FLN P1 network, observe the following guidelines:

- Avoid areas of high temperature, moisture, vibration, or other mechanical stress.
- Secure the cable where necessary to prevent its weight and the weight of other cables from pulling or twisting the cable.
- Use cable ducts, raceways, or other structures to protect the cable. Route the power cables apart from these structures.
- Avoid sources of electrical interference that can induce noise into the cable. Use the maximum practicable separation from such sources.

When planning cable routing within a building, follow these guidelines:

- Maintain a minimum separation of 1 m (3.3 ft) from the following equipment:
 - air conditioners and large blowers,
 - elevators and escalators,
 - radios and televisions,
 - intercom and security systems,
 - fluorescent, incandescent, and neon lighting fixtures.
- Maintain a minimum separation of 3 m (9.8 ft) from the following equipment:
 - line and motor power wiring,
 - transformers,
 - generators,
 - alternators.

When wiring in electrical equipment rooms or large electrical equipment line-ups, observe the following guidelines for cable segregation and separation of circuits:

- Use metallic conduit for drive wiring. Route control, network and power wiring in separate conduits.
- Separate non-metallic conduits or cable trays carrying power wiring from metallic conduit carrying low-level control network wiring by at least 305 mm (12 in.).
- Separate metallic conduits carrying power wiring or low-level control network wiring by at least 76 mm (3 in.).
- Whenever power and control wiring cross, the metallic conduits and non-metallic conduits or trays will cross at right angles.
- If necessary, use filters to attenuate conducted emissions from the drive to the line to help prevent interference with telecommunication, radio, and sensitive electronic equipment. Consult the Altivar catalog for selection and application of these filters.

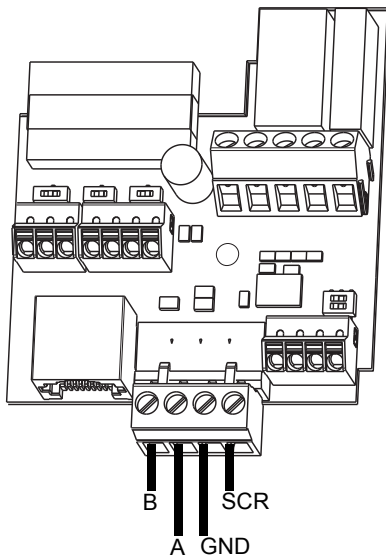
Connector pinout

Observe the following recommendations for wiring the terminals:

- Connections: 2-wire differential, common, and shield
- Maximum devices per segment: 32
- Maximum cable length: 1200 m (3637 ft)
- Line terminators: install line terminators at both ends of the line

Refer to the following figure for the pinout of the network terminal. When wiring the terminal:

1. Strip the cable sheath back approximately 10 mm (0.40 in.).
2. Use a flat blade screwdriver with a 0.6 mm (0.02 in.) thick and 3.5 mm (0.14 in.) wide blade for making the connections to the terminals.
3. Use a torque wrench to tighten the terminals to 0.5 to 0.6 N•m (4.4 to 5.3 lb-in.).



Contact	Signal
B	+
A	-
GND	Common
SCR	Shield

Configuration



4

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Communication parameters	20

Communication parameters

Configure the following parameters. Select APOGEE FLN P1 communication protocol by setting [Network protocol] (F B 2 9) to 3 [Apogee P1].

These parameters can only be modified when the motor is stopped.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

Refer to «Serial communication parameters» in the Altivar 212 Programming manual, for more information on how to set these serial communication parameters.

Failure to follow these instructions will result in death or serious injury.

Access to the parameters

Parameters	Location
[Command mode sel] (C P 0 d) [Frequency mode sel] (F P 0 d)	[PROGRAMMING MENU] Programming mode
[Remote spd ref 2] (F 2 0 7) [Mot. poles (comm.)] (F B 5 6)	[EXTENDED MENU] F - - - submenu of [PROGRAMMING MENU] Programming mode.
Other parameters	[COMMUNICATION MENU] C 0 0 submenu of [PROGRAMMING MENU] Programming mode.

Description

Modifications will be taken into account by the drive after power cycled.

Parameters	Possible values	Default value
[Command mode sel] (C P 0 d) Remote mode start/stop control source	0 [Logic inputs]: Control terminal logic input 1 [HMI]: Graphic display terminal 2 [Communication]: Serial communication	0
[Frequency mode sel] (F P 0 d) Remote mode primary speed reference source	1 [Ref source VIA]: VIA 2 [Ref source VIB]: VIB 3 [HMI reference]: Graphic display terminal 4 [Serial com ref]: Serial communication 5 [+/- Speed]: +/- speed from external contact	2
[Remote spd ref 2] (F 2 0 7) Remote mode secondary speed reference source	1 [VIA] 2 [VIB] 3 [HMI]: Graphic display terminal 4 [Communication]: Serial communication 5 [+/- Speed]: +/- speed from external contact	1
[Com channel choice] (F B 0 7) Communication channel selection	0 [RJ45] 1 [Open style]	1
[Network protocol] (F B 2 9) Communication protocol	1 [Mdb RTU]: Modbus® RTU protocol 2 [Metasys N2]: Metasys® N2 protocol 3 [Apogee P1]: APOGEE FLN P1 protocol 4 [BACnet]: BACnet protocol 5 [Lonworks]: Lonworks protocol	1
[Mot. poles (comm.)] (F B 5 6) Set the motor pole number. This parameter is for calculation of min-1 unit motor speed of APOGEE FLN P1 data	1 [2 poles] 5 [10 poles] 2 [4 poles] 6 [12 poles] 3 [6 poles] 7 [14 poles] 4 [8 poles] 8 [16 poles]	2
[Network address] (F B 9 0) Address	Set FLN device address. Setting range: 1 to 99	99

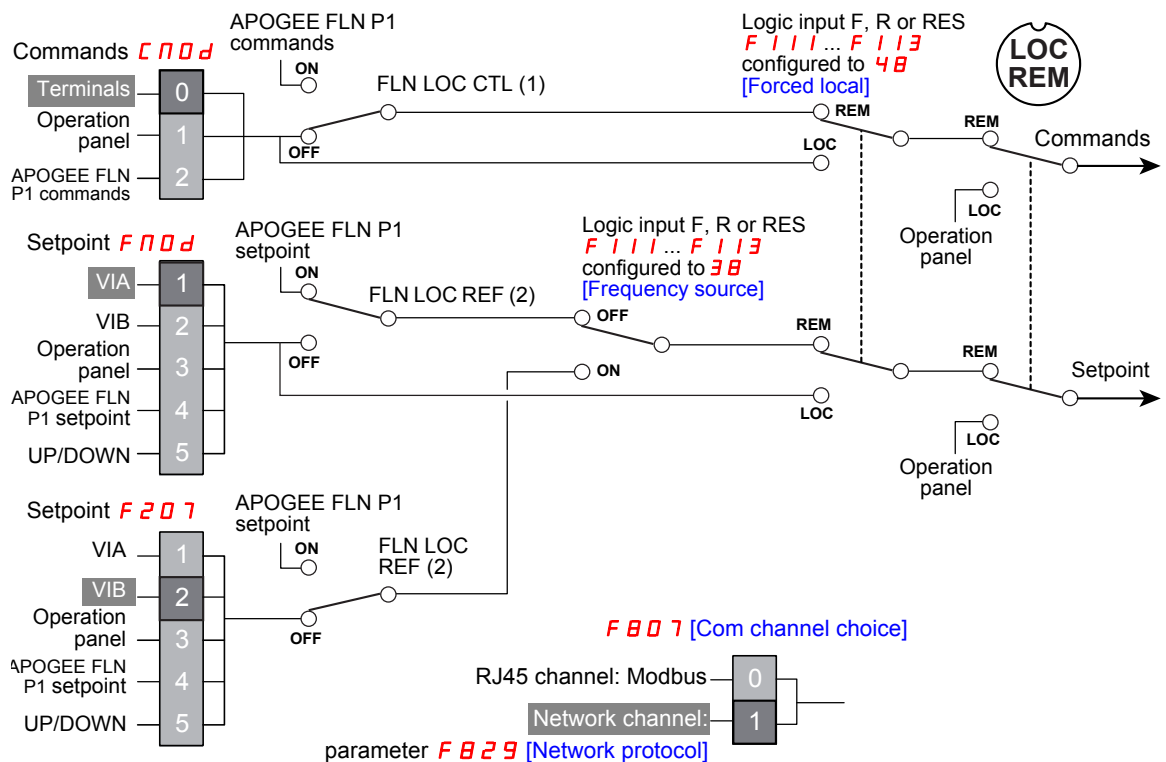
Parameters	Possible values	Default value
<p>[Network baud rate] (<i>F B 9 1</i>) Network Baud rate As soon as the drive detects the good bit rate this value will take the good value according to the speed.</p>	<p>0 [0]: 9600 bps 1 [1]: 4800 bps 2 [2]: 9600 bps 3 [3]: 19200 bps 4 [4]: 76800 bps 5 [5]: 57600 bps 6 [6]: 76800 bps Other parameters are fixed. 8bit, no parity, 1 stop</p>	0
<p>[Network time out] (<i>F B 9 2</i>) Network communication detected error trip time</p>	Setting range: 20 to 600 (2 to 60 s)	100
<p>[FA15] (<i>F A 1 5</i>) Communication counter Displays the total number of frames received by the drive since the last power ON. These values can be monitored by panel (monitor mode).</p>	Range: 0 to 999	0
<p>[FA16] (<i>F A 1 6</i>) Normal communication counter Displays the total number of bad frames received by the drive since the last power ON. These values can be monitored by panel (monitor mode).</p>	Range: 0 to 999	0

Command and speed reference channels

C N 0 d and *F N 0 d* drive parameters are used to set the channel for command and speed reference (first source).

F 2 0 7 drive parameter is used to set the second source of speed reference. Switching between source 1 and 2 is done by *F 2 0 0* parameter or logical input when set to this function.

F B 0 7 sets the communication channel (RJ45 or Open Style network connector)



(1) For more information, please refer to function FLN LOC CTL, page 31.

(2) For more information, please refer to function FLN LOC REF, page 31.

Network objects



5

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Logical Analog Input (LAI) Summary	26
Logical Analog Output (LAO) Summary	27
Logical Digital Input (LDI) Summary	28
Logical Digital Output (LDO) Summary	30
Message box Function Points	32
FLN P1 Detected error Codes	33

General

This database features 69 logical points: 20 Logical Analog Inputs (LAI), 18 Logical Analog Outputs (LAO), 17 Logical Digital Inputs (LDI) and 14 Logical Digital Outputs (LDO). These points configure, control or monitor the operation of the drive.

Point Summary

Point Number	Point Name	Factory Default	Engr. Units	Slope	Intercept	ON Text	OFF Text
01	CTLR ADDRESS	99	-	1	0	-	-
02	APPLICATION	2738	-	1	0	-	-
03	FREQ OUTPUT	0	HZ	0.1	0	-	-
04	PCT OUTPUT	0	PCT	0.1	0	-	-
05	SPEED	0	RPM	1	0	-	-
06	CURRENT	0	A	0.1	0	-	-
07	TORQUE	0	PCT	0.1	-200	-	-
08	POWER	0	kW	0.1	0	-	-
09	DRIVE TEMP	0	PCT	0.1	0	-	-
10	DRIVE KWH	0	kWH	1	0	-	-
11	DRIVE MWH	0	MWH	1	0	-	-
12	RUN TIME	0	H	1	0	-	-
13	DC BUS VOLT	0	V	1	0	-	-
14	OUTPUT VOLT	0	V	1	0	-	-
15	PRC PID FBCK	0	PCT	0.1	0	-	-
20	OVRD TIME	1	H	1	0	-	-
21	FWD.REV	FWD	-	1	0	REV	FWD
22	CMD FWD.REV	FWD	-	1	0	REV	FWD
23	STOP.RUN	STOP	-	1	0	RUN	STOP
24	CMD STP.STRT	STOP	-	1	0	RUN	STOP
25	EXT1.2 ACT	EXT1	-	1	0	EXT2	EXT1
26	EXT1.2 CMD	EXT1	-	1	0	EXT2	EXT1
27	DRIVE READY	NOTRDY	-	1	0	READY	NOTRDY
28	AT SETPOINT	NO	-	1	0	YES	NO
29	DAY.NIGHT	DAY	-	1	0	NIGHT	DAY
30	CURRENT LIM	0	A	0.1	0	-	-
31	ACCEL TIME 1	300	S	0.1	0	-	-
32	DECEL TIME 1	300	S	0.1	0	-	-
33	HANDAUTO ACT	AUTO	-	1	0	HAND	AUTO
36	FLN LOC ACT	AUTO	-	1	0	FLN	AUTO
37	CTL SRC	NO	-	1	0	YES	NO
38	FLN REF1 SRC	NO	-	1	0	YES	NO
39	FLN REF2 SRC	NO	-	1	0	YES	NO
40	DO 1 COMMAND	OFF	-	1	0	ON	OFF
41	DO 2 COMMAND	0	PCT	1	0	-	-
42	AO 1 COMMAND	0	PCT	0.1	0	-	-
49	RESET KWH	NO	-	1	0	RESET	NO

Point Number	Point Name	Factory Default	Engr. Units	Slope	Intercept	ON Text	OFF Text
50	PRC PID GAIN	10	PCT	0.1	0	-	-
51	PRC PID ITIM	600	S	0.1	0	-	-
52	PRC PID DTIM	0	S	0.1	0	-	-
58	DAMPER FBK	OFF	-	1	0	ON	OFF
59	LOCK PANEL	UNLOCK	-	1	0	LOCK	UNLOCK
60	INPUT REF1	0	PCT	0.1	0	-	-
61	INPUT REF2	0	PCT	0.1	0	-	-
66	SPD OUT MIN	0	PCT	0.1	0	-	-
67	SPD OUT MAX	1000	PCT	0.1	0	-	-
68	FLN LOC CTL	AUTO	-	1	0	FLN	AUTO
69	FLN LOC REF	AUTO	-	1	0	FLN	AUTO
70	DI 1 ACTUAL	OFF	-	1	0	ON	OFF
71	DI 2 ACTUAL	OFF	-	1	0	ON	OFF
72	DI 3 ACTUAL	OFF	-	1	0	ON	OFF
76	DO 1 ACTUAL	OFF	-	1	0	ON	OFF
77	DO 2 ACTUAL	OFF	-	1	0	ON	OFF
82	AI 1 ACTUAL	0	PCT	0.1	0	-	-
83	AI 2 ACTUAL	0	PCT	0.1	0	-	-
86	OK.ALARM	OK	-	1	0	ALARM	OK
88	ALARM WORD 1	-	-	1	0	-	-
89	ALARM WORD 2	-	-	1	0	-	-
90	LAST FAULT	-	-	1	0	-	-
91	PREV FAULT 1	-	-	1	0	-	-
92	PREV FAULT 2	-	-	1	0	-	-
93	OK.FAULT	OK	-	1	0	FAULT	OK
94	RESET FAULT	NO	-	1	0	RESET	NO
95	MBOX PARAM	-	-	1	0	-	-
96	MBOX DATA	-	-	1	0	-	-
97	MBOX READ	DONE	-	1	0	READ	DONE
98	MBOX WRITE	DONE	-	1	0	WRITE	DONE
99	ERROR STATUS	-	-	1	0	-	-

Logical Analog Input (LAI) Summary

General

Logical Analog Input (LAI) points are used for monitoring drive status items such as output frequency, current and voltage. The APOGEE® FLN P1 protocol supports 20 different logical analog input points. Change of value (COV) of LAI points can be enabled (LAI points are capable of being characterized). LAI points will respond to write point and memorize point commands, but will not change their actual values or indicate override active.

Logical Analog Input (LAI) Summary

Point Number	Point Name	Description	Factory Default	Engr. Units	Slope	Intercept
03	FREQ OUTPUT	The output frequency applied to the motor, in Hertz.	0	HZ	0.1	0
04	PCT OUTPUT	The ratio of output frequency or speed to the corresponding base frequency, depending on control mode.	0	PCT	0.1	0
05	SPEED	The calculated speed of the motor, in RPM. Use parameter F B 5 6 to configure the number of motor pole pairs.	0	RPM	1	0
06	CURRENT	The measured output current.	0	A	0.1	0
07	TORQUE	The calculated output torque of the motor as a percentage of nominal torque.	0	PCT	0.1	-200
08	POWER	The measured output power in kW. The FLN point definition also supports horsepower by selecting English units.	0	KW	0.1	0
09	DRIVE TEMP	The calculated thermal state of the drive.	0	PCT	0.1	0
10	DRIVE KWH	The drive's cumulative power consumption in kilowatt-hours. This value may be reset by commanding FLN point 49, RESET KWH.	0	KWH	1	0
11	DRIVE MWH	The drive's cumulative power consumption in megawatt hours. This value may be reset by commanding FLN point 49, RESET KWH.	0	MWH	1	0
12	RUN TIME	The drive's cumulative run time in hours. This value may be reset by commanding FLN point 48, RESET RUN TIME.	0	H	1	0
13	DC BUS VOLT	The DC bus voltage level of the drive.	0	V	1	0
14	OUTPUT VOLT	The AC output voltage applied to the motor.	0	V	1	0
15	PRC PID FBCK	The ratio of PID feedback signal to the corresponding [Upper limit freq] (UL).	0	PCT	0.1	0
82	AI 1 ACTUAL	Indicates the input level of VIB terminal.	0	PCT	0.1	0
83	AI 2 ACTUAL	Indicates the input level of VIA terminal.	0	PCT	0.1	0
88	ALARM WORD 1	This point is a bit-field indicating active alarms in the drive.	-	-	1	0
89	ALARM WORD 2	This point is a bit-field indicating active alarms in the drive.	-	-	1	0
90	LAST FAULT	This point is first in the drive's detected fault log and indicates the last event declared.	-	-	1	0
91	PREV FAULT 1	This point is second in the drive's detected fault log and indicates the previous event declared.	-	-	1	0
92	PREV FAULT 2	This point is last in the drive's detected fault log and indicates the oldest event in the log.	-	-	1	0

Logical Analog Output (LAO) Summary

Logical Analog Output (LAO) points are used for setting and monitoring control points such as the drive's frequency command and configuration parameters.

The APOGEE FLN P1 protocol supports 17 different logical analog output points (15 of them are for the ATV212 parameters and commands, while the others are reserved for maintaining compliance). The values of logical analog output points can be modified by write point or memorize point commands. Release commands will not cause the logical analog output points to automatically return to their pre-override values. LAO points do not support COV (Change Of Value).

Logical Analog Output (LAO) Summary

Point Number	Point Name	Description	Factory Default	Engr. Units	Slope	Intercept
01	CTLR ADDRESS	The FLN address of the drive. It can be set from the FLN network and by the panel	99	-	1	0
02	APPLICATION	The Application ID for APOGEE FLN P1	2738	-	1	0
20	OVRD TIME	1 of the 5 mandatory FLN points required for compatibility with Siemens control systems. It has no functionality in the drive application.	1	H	1	0
30	CURRENT LIM	Sets the output current limit of the drive.	110	A	0.1	0
31	ACCEL TIME 1	Sets the acceleration time for ramp 1.	300	S	0.1	0
32	DECEL TIME 1	Sets the deceleration time for ramp 1.	300	S	0.1	0
42	AO 1 COMMAND	Controls the output state of FM terminal.	0	PCT	0.1	0
50	PRC PID GAIN	Sets the proportional gain of the PID.	10	PCT	0.1	0
51	PRC PID ITIM	Sets the integration time of the PID.	600	S	0.1	0
52	PRC PID DTIM	Sets the derivation time of the PID.	0	S	0.1	0
60	INPUT REF1 *	Sets setpoint 1. This setpoint is enabled at #26 EXT1.2 CMD = 0.	0	PCT	0.1	0
61	INPUT REF2 *	Sets setpoint 2. This setpoint is enabled at #26 EXT1.2 CMD = 1.	0	PCT	0.1	0
66	SPD OUT MIN	Sets the minimum output speed of the drive as a percentage of the motor nominal rating.	0	PCT	0.1	0
67	SPD OUT MAX	Sets the maximum output speed of the drive as a percentage of the motor nominal rating.	1000	PCT	0.1	0
95	MBOX PARAM	Sets the parameter to be used by the message box function. Refer to section 5.	-	-	1	0
96	MBOX DATA	Sets or indicates the data value of the message box function. Refer to section 5.	-	-	1	0
99	ERROR STATUS	1 of the 5 mandatory FLN points required for compatibility with Siemens control systems. It has no functionality in the drive application	-	-	1	0

* 100% = [Upper limit freq] (*UL*), [Max frequency] (*FH*) limits this value.

Logical Digital Input (LDI) Summary

Logical Digital Input (LDI) points are used for drive status monitoring such as terminal ON/OFF conditions and status. The APOGEE FLN P1 protocol supports 19 different logical digital input points. LDI points support COV (LDI points are capable of being characterized). LDI points will respond to write point and memorize point commands, but will not change their actual values or indicate that an override is active.

Point Number	Point Name	Description	Factory Default	Slope	Intercept	ON (1) Text	OFF (0) Text
21	FWD.REV	Indicates the rotational direction of the motor, regardless of control source.	FWD	1	0	REV	FWD
23	STOP.RUN	Indicates the run status of the drive, regardless of control source.	STOP	1	0	RUN	STOP
25	EXT1.2 ACT	Indicates whether channel 1 or channel 2 is the active control source.	EXT1	1	0	EXT2	EXT1
27	DRIVE READY	Indicates the drive is ready to accept a run command.	NOTRDY	1	0	READY	NOTRDY
28	AT SETPOINT	Indicates the drive has reached its commanded setpoint.	NO	1	0	YES	NO
33	HANDAUTO ACT	Indicates whether the drive is in local (HAND) or remote (AUTO) control.	AUTO	1	0	HAND	AUTO
36	FLN LOC ACT	Indicates if the drive has been placed in "FLN LOCAL" mode by commanding either point 68 (FLN LOC CTL) or point 69 (FLN LOC REF). Commanding either of these points to FLN removes control from its normal source and places it under FLN control. The HAND mode of the panel has priority over FLN local control.	AUTO	1	0	FLN	AUTO
37	CTL SRC	Indicates if the FLN network is a source for control inputs.	NO	1	0	YES	NO
38	FLN REF1 SRC	Indicates if the FLN network is the source for setpoint 1.	NO	1	0	YES	NO
39	FLN REF2 SRC	Indicates if the FLN network is the source for setpoint 2.	NO	1	0	YES	NO
70	DI 1 ACTUAL (F)	Indicates the status of digital Input 1. This value depends on the status of the F terminal.	OFF	1	0	ON	OFF
71	DI 2 ACTUAL (R)	Indicates the status of digital Input 2. This value depends on the status of the R terminal.	OFF	1	0	ON	OFF
72	DI 3 ACTUAL (RES)	Indicates the status of digital Input 3. This value depends on the status of the RES terminal.	OFF	1	0	ON	OFF
76	DO 1 ACTUAL	Indicates the status of digital output 1. This value depends on the status of the FL terminal.	OFF	1	0	ON	OFF
77	DO 2 ACTUAL	Indicates the status of digital output 2. This value depends on the status of the RY terminal.	OFF	1	0	ON	OFF
86	OK.ALARM	Indicates the current state of the drive.	OK	1	0	ALARM	OK

93	OK.FAULT	Indicates the current state of the drive.	OK	1	0	FAULT	OK
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Logical Digital Output (LDO) Summary

Logical Digital Output (LDO) points are used for executing drive commands such as RUN/STOP and trip clear. The APOGEE FLN P1 protocol supports 12 different logical digital output points (11 are for drive control, one special point is reserved for maintaining compliance). The values of logical digital output points can be modified by write point or memorize point commands. Release commands will not cause the logical digital output points to automatically return to their pre-override values. LDO points do not support COV.

Point Number	Point Name	Description	Factory Default	Slope	Intercept	ON (1) Text	OFF (0) Text
22	CMD FWD.REV	Commanded from the FLN network to change the rotational direction of the drive. This command is active only if the drive is configured for control from the FLN network.	FWD	1	0	REV	FWD
24	CMD STP.STRT	Commanded from the FLN network to start the drive. This command is active only if the drive is configured for control from the FLN network.	STOP	1	0	RUN	STOP
26	EXT1.2 CMD	Commanded from the FLN network to select channel 1 or channel 2 as the active control source (0 = #60 INPUT REF1, 1 = #61 INPUT REF2).	EXT1	1	0	EXT2	EXT1
29	DAY.NIGHT	1 of the 5 mandatory FLN points required for compatibility with Siemens control systems. It has no functionality in the drive application.	DAY	1	0	NIGHT	DAY
40	DO 1 COMMAND (FL) *	Controls the output state of FL terminal.	OFF	1	0	ON	OFF
41	DO 2 COMMAND (RY) *	Controls the output state of RY terminal.	OFF	1	0	ON	OFF
49	RESET KWH	Commanded by the FLN network to reset the cumulative kilowatt-hour counter (1 = RESET, 0 = NO). The control input is rising-edge sensitive, so, once the command is issued, this point automatically returns to its inactive state. This momentary operation avoids any need for an explicit command to clear the point before a subsequent reset can be issued.	NO	1	0	RESET	NO
58	DAMPER FBK	1: damper feedback from P1 communication;	OFF	1	0	ONN	OFF
59	LOCK PANEL	Commanded from the FLN network to lock the panel and help prevent parameter changes (1 = LOCK, 0 = UNLOCK).	UNLOCK	1	0	LOCK	UNLOCK

Point Number	Point Name	Description	Factory Default	Slope	Intercept	ON (1) Text	OFF (0) Text
68	FLN LOC CTL	Commanded from the FLN network to temporarily remove start/stop control of the drive from its normal source and place it under FLN network control. This functionality is analogous to placing the drive in HAND mode at the panel, with the control being taken by the FLN network instead. HAND mode at the panel has priority over this point. Thus, this point is only effective in temporarily taking control from the digital inputs or some other internal control functionality.	AUTO	1	0	FLN	AUTO
69	FLN LOC REF	Commanded from the FLN network to temporarily remove input setpoint control of the drive from its normal source and place it under the FLN network control. This functionality is analogous to placing the drive in HAND mode at the panel, with the setpoint control being taken from the FLN network instead. HAND mode at the panel has priority over this point. Thus, this point is only effective in temporarily taking control from the analog inputs or some other internal control functionality.	AUTO	1	0	FLN	AUTO
94	RESET FAULT	Commanded from the FLN network to reset the drive (1 = RESET, 0 = NO). The control input is rising-edge sensitive, so, once the command is issued, this point automatically returns to its inactive state. This momentary operation avoids any need for an explicit command to clear the point before a subsequent reset can be issued.	NO	1	0	RESET	NO
97	MBOX READ	The parameter value specified by MBOX PARAM is read when set to 1.	DONE	1	0	READ	DONE
98	MBOX WRITE	The value of MBOX DATA is written to the parameter specified by MBOX PARAM when set to 1.	DONE	1	0	WRITE	DONE

* Set the parameter **F 132** = 38 (39) for FL terminal. Set the parameter **F 130** = 40 (41) for RY terminal.

Message box Function Points

Use the APOGEE FLN P1 points described below to read from and write drive parameters.

ATV212 Parameter Access Point Table

Point Number	Point Type	Point Name	Description
95	LAO	MBOX PARAM	Contains the hexadecimal address of the parameter to be accessed.
96	LAO	MBOX DATA	The read value is set.
97	LDO	MBOX READ	The parameter value specified by MBOX PARAM is read when set to 1.
98	LDO	MBOX WRITE	The value of MBOX DATA is written to the parameter specified by MBOX PARAM when set to 1.

Example 1: Read the [Deceleration time 1] (*d E C*) (Comm. No. 0010)

- 1) Write "16" as the communication address to [MBOX PARAM \(LAO #95\)](#).
*Write the communication address as the decimal equivalent of the parameter's hexadecimal address 0x0010 = 16 dec.
- 2) Write "1" to [MBOX READ \(LDO #97\)](#).
- 3) The read value is set to [MBOX DATA \(LAO #96\)](#). The unit of the return value is 0.1s.

Example 2: Write "50.0Hz" to [VIB freq. point 2] (*F 2 I 3*) (Comm. No. 0213)

- 1) Write "531" as the communication address to [MBOX PARAM \(LAO #95\)](#).
* 0x0213 = 531 dec.
 - 2) Write "5000" to [MBOX DATA \(LDO #96\)](#).
* 5000 = 50.00 Hz, unit is 0.01 Hz
 - 3) Write "1" to [MBOX WRITE \(LDO #98\)](#).
- * The time from receipt of the last character of a message to the transmission of the first character of the response is about 40 ms.
* A response is "NAK (detected error code = 0x00FE)" when a communication address does not exist.

FLN P1 Detected error Codes

When an operation as a result of a P1 command is unsuccessful, detected error code NAK is returned.

Below is a list of possible codes that can be returned by a FLN device.

List of Codes

Code	Description
0x00D7	Operator priority too low. A number of situations can return this code.
0x00F9	Invalid point number.
0x00FB	No COVs to report.
0x00FC	Request Characterization.
0x00FD	Invalid command.
0x00FE	Invalid value. *

* Including the response for Dump Memory command (0x0018) and Modify Memory command (0x0019). APOGEE FLN P1 protocol does not support these commands.

Diagnostics



6

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Communication detected faults	36
LED indicators	37

Communication detected faults

General

The drive trips in *Err 5* [Com RJ45 fault] or *Err B* [Network error fault] if the communication was established and the card no longer receives messages from the network.

The response of the drive in the event of an APOGEE FLN P1 communication interruption can be configured by the parameter [Com. fault setting] *FBS I*.

Access to the parameters

Parameter *FBS I* is accessible in the [COMMUNICATION MENU] *C D n* submenu of [PROGRAMMING MENU] Programming mode.

Time out setting

If active communication channel [Com channel choice] *FBD 7* is set to *I* [Open style], time out is set using [Network time out] *FBS 2* parameter.

Behaviour on detected fault

Parameter description	Possible value	Default value
[Com. fault setting] (<i>FBS I</i>) Drive behavior after a communication interruption	<p>0 [Ramp stp (F/Cmod)]: Communication release. Drive ramps to a stop. Serial control is relinquished to sources defined by [Command mode sel] (<i>CND d</i>) and [Frequency mode sel] (<i>FND d</i>)</p> <p>1 [No active]: No action. Last commanded operation continues.</p> <p>2 [Ramp stop]: Deceleration stop. Drive ramps to a stop. Serial control is maintained.</p> <p>3 [Freewheel]: Drive removes power from the motor which coasts to a stop. Serial control is maintained.</p> <p>4 [Err5 or Err8]: Drive ramps to a stop. An <i>Err 5</i> [Com RJ45 fault] or <i>Err B</i> [Network error fault] is displayed.</p>	4

⚠ WARNING

LOSS OF CONTROL

If *FBS I* is set to *I*, communication control will be inhibited.

For safety reasons, inhibiting the communication interruption detection should be restricted to the debug phase or to special application.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ WARNING

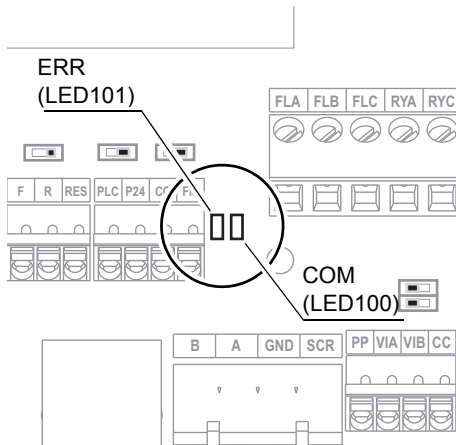
LOSS OF CONTROL

Know and understand the setting of parameter *FBS I*. This parameter controls the behavior of the drive in the event of a network communication loss. If the value of *FBS I* is *0*, *1*, *2*, or *3*, the drive will not trip on an *Err B*.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

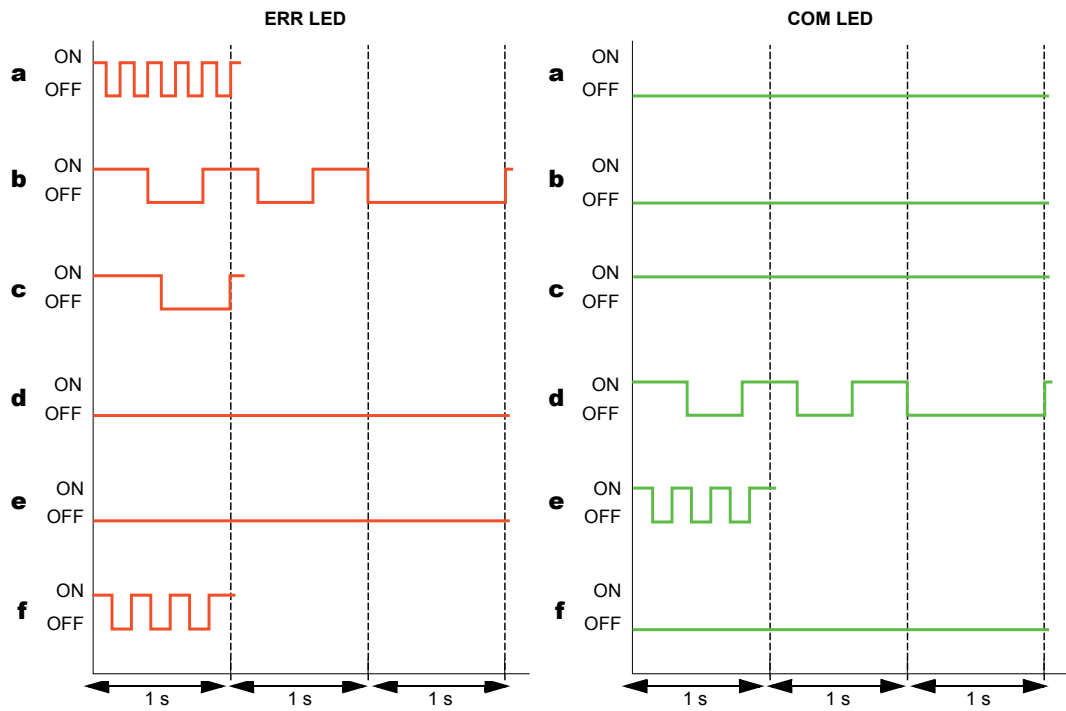
LED indicators

Location



Description

The product has two LEDs, ERR red LED and COM green LED.



Functions

State	ERR: Red LED	COM: Green LED	Comment
a	Flashing 5 times in 1 second	OFF	Invalid message received
b	Flashing 3 times in 2 second, OFF for 1 second	OFF	Communication loss detected
c	ON 0.5 s, OFF 0.5 s	ON	Invalid configuration detected
d	OFF	Flashing 3 times in 2 second, OFF for 1 second	Waiting for auto baudrate detection
e	OFF	Flashing Intermittent	Valid message received for this node
f	Flashing Intermittent	OFF	Not applicable

Detected fault possible causes and remedies

State	ERR: Red LED	COM: Green LED	Possible causes	Remedies
-	OFF	OFF	Drive not operating or turned off	Check the power supply.
a	Flashing 5 times per second	OFF	Internal communication error	<ul style="list-style-type: none"> • Check the environment (electromagnetic compatibility). • Check the card/drive connection. • Inspect or repair the drive.
b	Flashing, 3 times in 2 seconds, off for 1 second	OFF	ATV212 has not received valid message within time-out period.	<ul style="list-style-type: none"> • Check the environment (electromagnetic compatibility). • Check the wiring. • Check that the master is communicating within the time out period (= 10 s).
c	Flashing, ON 0.5 second OFF 0.5 second	ON	Invalid configuration detected	<ul style="list-style-type: none"> • Check the internal communication parameters
e			Green LED will flash whenever valid message is received.	NA
f	Intermittent flash	Intermittent flash	Red LED will flash whenever invalid message is received.	<ul style="list-style-type: none"> • Check the environment (electromagnetic compatibility). • Check the communication parameter configuration (protocol, speed, format). • Do not forget that the communication parameter configuration is only taken into account by the drive following a power break. • Check that the slave address is unique.

Reports



The card is able to generate 6 predefined reports:

- Device
- Startup
- Overview
- Drive I/O
- Drive Config
- Process PID

These reports are initiated from the P1 controller, please refer to the manufacturer instructions before proceeding.

Here is an example of report.

```

01/01/2010 TUE                TEC REPORT DISPLAY REPORT                23:01
-----
Search for <ATV212:STARTUP>
TEC name
  :Suffix (Description)                Value                State  Priority
-----
ATV212
[21] :FWD.REV                FWD                -N-    NONE
[22] :CMD FWD.REV            FWD                -N-    NONE
[23] :STOP.RUN                RUN                -N-    NONE
[24] :CMD STP.STRT            RUN                -N-    OVRD
[36] :FLN LOC ACT            OFF                -N-    NONE
[60] :INPUT REF1              65.9 PCT           -N-    OVRD
[61] :INPUT REF2              0.0 PCT            -N-    NONE
[68] :FLN LOC CTL            OFF                -N-    NONE
[69] :FLN LOC REF            OFF                -N-    NONE
[94] :RESET FAULT            NO                 -N-    OVRD

End of report
    
```