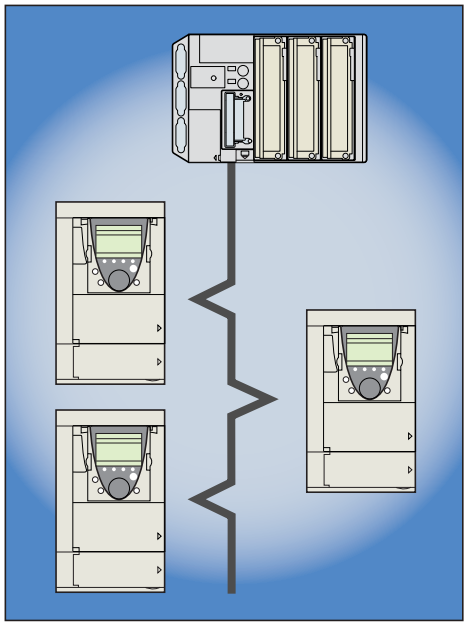
Altivar® 61

APOGEE® FLN P1 card

User manual

VW3A3314

10/2010



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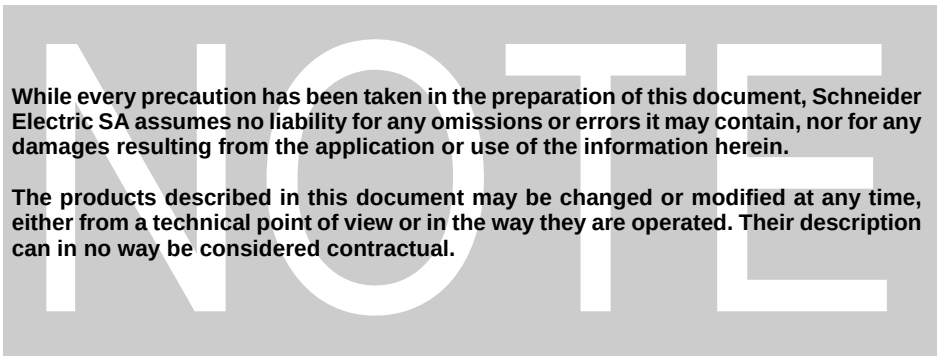

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1. Important Information

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 personnal if the instruction are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages 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.

PLEASE NOTE

The word "drive" as it is 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.

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2. Before you begin

Read and understand these instructions before performing any procedure with this drive.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this manual before installing or operating the Altivar 61 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. Then follow the “Bus Voltage Measurement Procedure” page 12 to verify that the DC voltage is less than 42 V. The drive LEDs are not indicators of the absence of DC bus voltage.
- 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.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Test and ensure that any changes made to the parameter settings do not present any danger to personnel and equipment during drive operation.
- Do not use this APOGEE® FLN P1 option card with ATV61 drive firmware earlier than Version V1.6IE18. These versions will not detect an inoperative card.

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

⚠ WARNING

DAMAGED 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 additional 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.[a]
- Each implementation of an ATV61 APOGEE® FLN P1 option card must be individually and thoroughly tested for proper operation before being placed into service.

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

a. 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."

3. Introduction

Thank you for purchasing the APOGEE® FLN P1 option card (VW3A3314) for Altivar 61 drive.

IMPORTANT: this communication option card is fully supported with the version V1.6 IE 18 of the Altivar 61 firmware.

By Installing this board into the Altivar 61, data communication can be made with a host computer or other device via APOGEE® FLN P1 network.

The communication card has a 4 pole open style connector for connection to the network: A, B, GND, SCR.

Data exchanges give access to these Altivar 61 functions:
- Control (start, stop, reset, setpoint),
- Monitoring (status, current, voltage, thermal state...),
- Diagnostics (alarms).

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

4. Documentation structure

■ APOGEE® FLN P1 manual

The present APOGEE® FLN P1 user manual describes:
- connection to APOGEE® FLN P1,
- configuration of the communication-specific parameters via the integrated HMI or the graphic HMI,
- diagnostics,
- networks variables.

You will also find important information in other Altivar 61 technical documents. They are available on the Web site www.schneider-electric.com.

■ Installation manual

The installation manual describes:
- how to assemble the drive (particularly how to mount the APOGEE® FLN P1 card),
- how to connect the drive.

■ Programming manual

The programming manual describes:
- the functions and parameters of the drive,
- how to use the drive HMI (integrated HMI and graphic HMI).

■ Communication parameters manual

The Communication parameters manual describes:
- the operating modes specific to communication (CiA 402 state chart),
- the interaction between communication and local control (HMI and terminals),
- the drive parameters with specific information for use via a communication network (addresses, formats, etc).

When using the APOGEE® FLN P1 card, some sections of the Communication parameters manual are not relevant :
- profiles,
- I/O profile
- CiA 402 profile.

The description of drive parameters is useful only if you use the parameters access function of the APOGEE® FLN P1 (MBOX READ, MBOX WRITE, MBOX PARAM, MBOX DATA).

5. Notation

■ Drive terminal displays

The graphic display terminal menus are shown in square brackets.
Example: [1.9 COMMUNICATION].

The integrated 7-segment display terminal menus are shown in round brackets with a "-" at the end.
Example: (COM-).

Parameter names displayed on the graphic display terminal are written in square brackets.
Example: [Fallback speed]

Parameter codes displayed on the integrated 7-segment display terminal are written in round brackets.
Example: (LFF).

■ Formats

Hexadecimal values are written as follows: 16# or 0x
Binary values are written as follows: 2#

■ Abbreviations

O = Optional
M = Mandatory

6. Quick start

The integrated 7-segment display terminal menus are not shown in this table.

Operation		Refer to
A	**How to reset the drive to the factory settings:** [1 DRIVE MENU] [1.12 FACTORY SETTINGS] • Select [Config. Source]: Macro-conf, • Select [PARAMETER GROUP LIST]: All • Select [Goto FACTORY SETTINGS]	Programming manual [1.12 FACTORY SETTINGS] (FCS-)
B	**How to configure the main APOGEE® FLN P1 communication parameters:** In the menu: [1 DRIVE MENU] [1.9 COMMUNICATION] [P1] • Check [Address] to the desired APOGEE® FLN P1 address	"Communication parameters", page 15
C	**How to configure the drive so that control comes from the APOGEE® FLN P1 network** In the menu: [1 DRIVE MENU] [1.6 COMMAND] • Change [Ref.1 channel] from "AI1" to "Com. card"	"Control", page 16
D	**Monitor and Control the drive through the APOGEE FLN P1 network** • Control start / stop by the binary value CMD STP.STRT, • Control the velocity setpoint by the analog value INPUTREF 1, • Control direction of rotation by the binary value CMD FWD.REV, • Monitor if the drive is controlled via local or remote (APOGEE® FLN P1) by the binary value FLN LOC CTL ACT, • Monitor the running / stopped state by the binary value STOP.RUN, • Monitor the actual direction of rotation by the binary value FWD.REV, • Monitor the actual speed or frequency by the analog value SPEED or PCT OUTPUT. **Detected fault management:** • Monitor the operating state by the binary value OK.FAULT, • Monitor the detail by the analog value ERROR STATUS, • Remote reset the communication card by the binary value RESET FAULT.	11. Network objects page 28
E	**Switch local / remote by the drive HMI** Press F4 key (marked TK) to switch alternately from between APOGEE® FLN P1 and HMI. The right of the upper display line: - REM: control by APOGEE® FLN P1, - LOC: control by HMI.	Programming manual Graphic display terminal Description of the graphic screen
F	**Monitor and diagnose the status of the APOGEE FLN P1 network communication by the drive HMII** In the menu: [1 DRIVE MENU] [1.2 - MONITORING] [COMMUNICATION MAP] [DIAG NETWORK]	"Checking the communication", page 25
G	**Diagnose APOGEE® FLN P1 communication by the drive HMI** In the menu: [1 DRIVE MENU] [1.2 - MONITORING] [COMMUNICATION MAP] • Check that the Command Channel is Com. card, • Check that Active ref. channel is Com. card.	"Checking the communication", page 25
H	**Disable network fault detection for testing** In the menu: [1 DRIVE MENU] [1.8 FAULT MANAGEMENT] (FLt-) Configure [COM. FAULT MANAGEMENT] to [Ignore].	Programming manual [1.8 FAULT MANAGEMENT] (FLt-)

7. Hardware setup

7. 1. Receipt

- Check that the card reference printed on the label is the same as that on the delivery note corresponding to the purchase order.
- Remove the option card from its packaging and check that it has not been damaged in transit.

Electrostatic Precautions

⚠ CAUTION

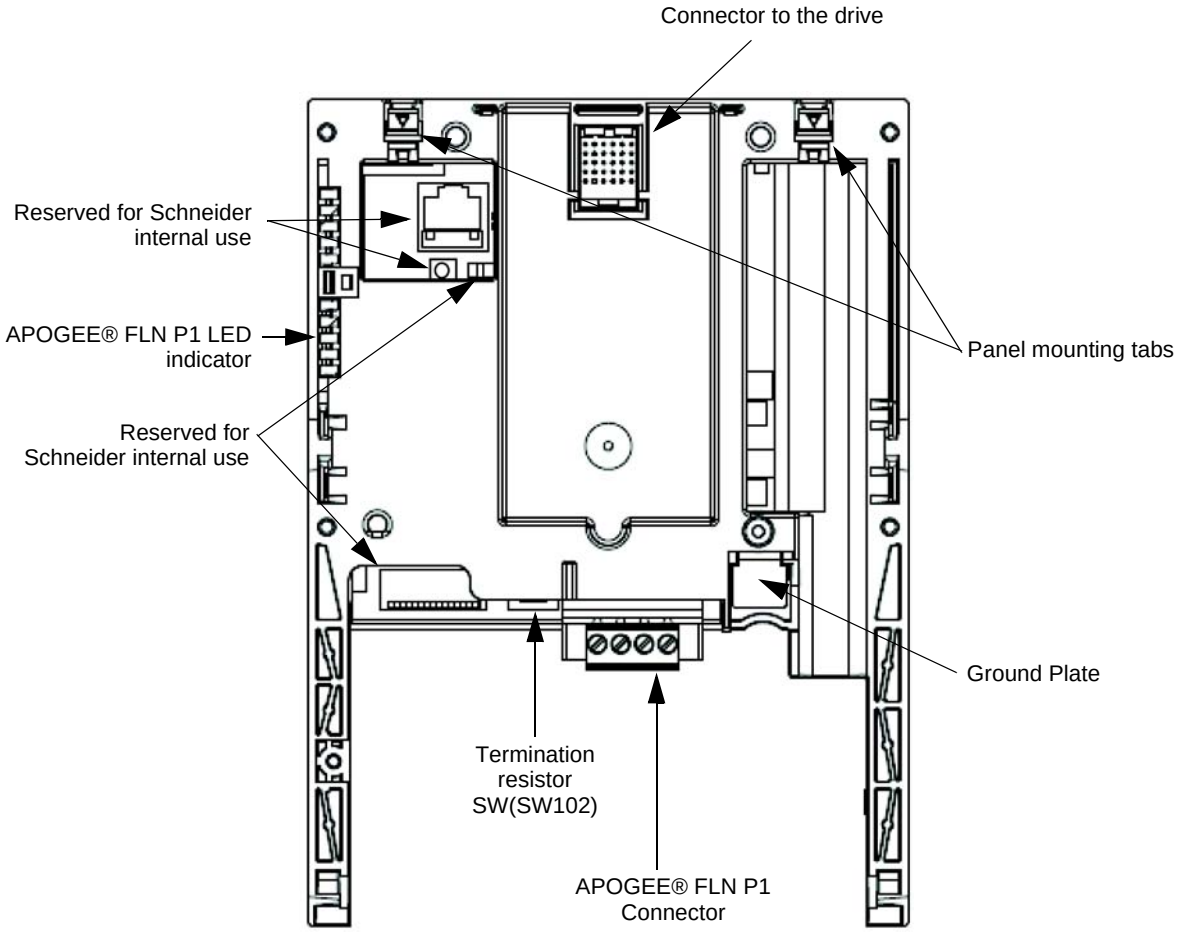
STATIC SENSITIVE COMPONENTS

The APOGEE® FLN P1 option card can be damaged by static electricity. Observe the electrostatic precautions below when handling circuit boards or testing components.

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

Observe the following precautions for handling static-sensitive components:
- Keep static-producing material such as plastic, upholstery, and carpeting out of the immediate work area.
- Store the APOGEE® FLN P1 card in its protective packaging when it is not installed in the drive.
- When handling the APOGEE® FLN P1 card, wear a conductive wrist strap connected to the card through a minimum of 1 megohm resistance.
- Avoid touching exposed conductors and component leads with skin or clothing.

7. 2. Hardware description



7. 3. Bus voltage measurement procedure

Before working on the drive, remove all power and wait 15 minutes to allow the DC bus to discharge. Then measure the DC bus voltage between the PA/+ and PC/– terminals.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Read and understand the precautions in “Before you begin” on page 5 before performing this procedure.

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

The DC bus voltage can exceed 1,000 Vdc. Use a properly rated voltage-sensing device when performing this procedure. To measure the DC bus voltage:

1 Disconnect all power.

2 Wait 15 minutes to allow the DC bus to discharge.

3 Measure the voltage of the DC bus between the PA/+ and PC/– terminals to ensure that the voltage is less than 42 Vdc.

4 If the DC bus capacitors do not discharge completely, contact your local Schneider Electric representative. Do not repair or operate the drive.

7. 4. Installing the card in the drive

Refer to the Installation manual.

8. Connecting to the bus

8. 1. Cable routing practices

⚠ WARNING

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 ATV61 drive comply with all wiring instructions in this manual.

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

When wiring Altivar 61 drives to a APOGEE® FLN P1 network, follow all wiring practices required by national and local electrical codes. Also 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. Use these structures for signal wiring paths. They must not contain power wiring.
- 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.

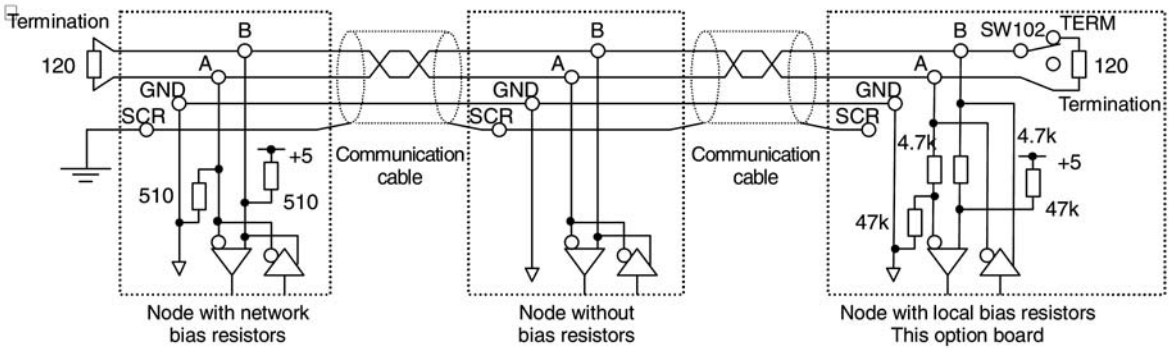
When wiring in electrical equipment rooms or large electrical equipment line-ups, observe the following guidelines for cable segregation and separation of circuits:
- Use metallic conduit for drive wiring. Do not run control network and power wiring in the same conduit.
- Separate non-metallic conduits or cable trays used to carry power wiring from metallic conduit carrying low-level control network wiring by at least 300 mm (12 in).
- Separate metallic conduits carrying power wiring or low-level control network wiring by at least 80 mm (3 in).
- Cross the metallic conduits and non-metallic conduits at right angles whenever power and control network wiring cross.
- Attenuate conducted emissions from the drive to the line in some installations to help prevent interference with telecommunication, radio, and sensitive electronic equipment. Such instances may require attenuating filters. Consult the Altivar catalog for selection and application of these filters.

Maximum length of bus	1000 m (3280 ft) at 19,200 bps (9600 bps max. with APOGEE® FLN P1)
Maximum number of stations	32 stations, i.e, 31 slaves (without repeater)

8. 2. Network configuration

Make up the network as follows:

- Transmit/receive signals (A, B)
  Connect all transmit / receive data lines to ensure proper data transmission.
- Signal common (GND)
  GND is the signal common.
- Grounding the shield of the network cable (SCR)
  Connect the shield lines of network cable. Only ground the shield at one point to help prevent noise currents from being created and interfering with network communications.
- Termination resistor
  A termination resistance of 120 ohms +/- 5% should be connected at each of the two ends of the network segment. The ATV61 P1 option card has a built in terminating resistor. To use this resistor, refer to section 7. 2. Hardware description.
  At least one set, and no more than two sets, of network bias resistors shall exist for each segment. This option has local bias resistors.



* It is recommended that the Siemens Building Automation FLN Trunk Terminator (PN: 538-664) be used and that the network termination switch on the APOGEE® FLN P1 card, SW102, be set to OFF.

N.B.: Do not connect the SCR terminal to the power ground of drives or other units.
Keep the network cables 20 cm or more separate from the power cables to help prevent from malfunctioning due to electromagnetic noise.

8. 3. Card connector pinout

Contact	Signal
B	+
A	-
GND	GND
SCR	Shield

- The cable sheath should be stripped off by about 10 mm (0.4 in).
- For wiring the terminals, use a slotted screwdriver with a 0.6 mm (0.02 in) thick and 3.5 mm (0.14 in) width blade.
- Tightening torque for the terminal block is 0.5 to 0.6 N·m (0.37-0.44 ft·lb).

9. Configuration

9. 1. Communication parameters

Configure the following parameters in the [1.9 - COMMUNICATION] (COM-) menu, [P1] (P1-) submenu.
These parameters can only be modified when the motor is stopped.

Parameter	Possible values	Terminal Display	Default value
[Address] (1) (AdrC)	0 to 99 0,99: disabled.	[99] (99)	99
[Baud rate] (2) (Bdr)	[4800 Bd] (4-8) [9600 Bd] (9_6) [19200 Bd] (19_2) [38400 Bd] (38_4) [57600 Bd] (57_6) [76800 Bd] (76_8)	[4800 Bd] (4-8) [9600 Bd] (9_6) [19200 Bd] (19_2) [38400 Bd] (38_4) [57600 Bd] (57_6) [76800 Bd] (76_8)	9600
[Network time out] (tLP)	2.0 to 60.0 seconds	[2] (2)	10.0

(1) Modifications will be taken into account immediatly.
(2) Modifications will only be taken into account by the drive after power cycled.

9. Configuration

9. 2. Control

Numerous configurations are possible. For more information, refer to the Programming manual and the Communication parameters manual.
The following configurations are just some of the possibilities available.

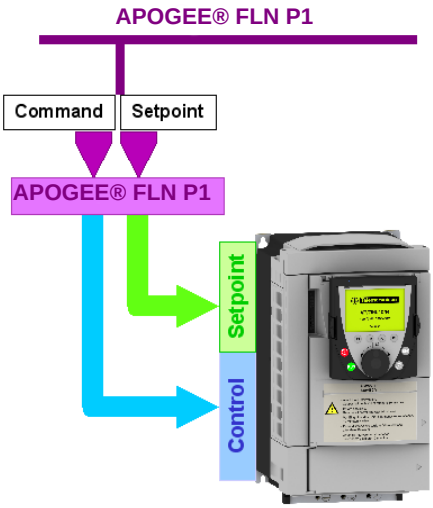
■ Allowed configurations

If the drive is only monitored by APOGEE® FLN P1:
There is no configuration constraint.

If the drive is controlled by APOGEE® FLN P1:
The parameter [Profile] (CHCF) must be configured to [Not separ.] (SIM) or [Separate] (SEP). [Not separ.] (SIM) is the default value.
It is not allowed to configure the parameter [Profile] (CHCF) to the value [8 serie] (SE8) or [I/O profile] (IO).
If an unallowed configuration is set, the drive will trip on [External fault com.] (EPF2).
However, if the I/O profile is configured and no command channels are assigned to the communication card, the drive will not trip.

■ Control via APOGEE® FLN P1

The command and the setpoint come from APOGEE® FLN P1.



Configure the following parameters:

Parameter	Value	Comment
Profile	Not separate	Both the start/stop command and speed reference come from the same channel set in [Ref.1 chan]. The run start/stop command follows the CiA402 profile.
Setpoint 1 and command configuration	Network card	The setpoint and command come from APOGEE® FLN P1.

Configuration via the graphic display terminal or the integrated display terminal:

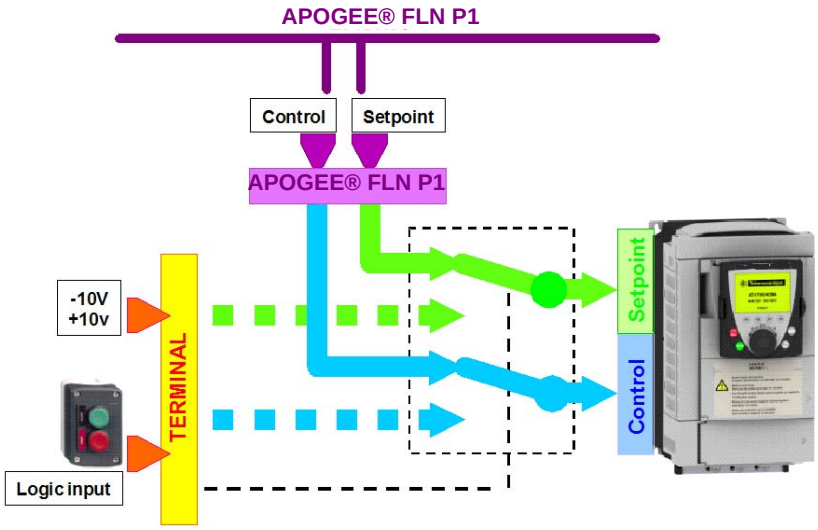
Menu	Parameter	Value
[1.6 - COMMAND] (CTL-)	[Profile] (CHCF)	[Not separ.] (SIM): default value
	[Ref.1 chan] (Fr1)	[Com. card] (nET)

9. Configuration

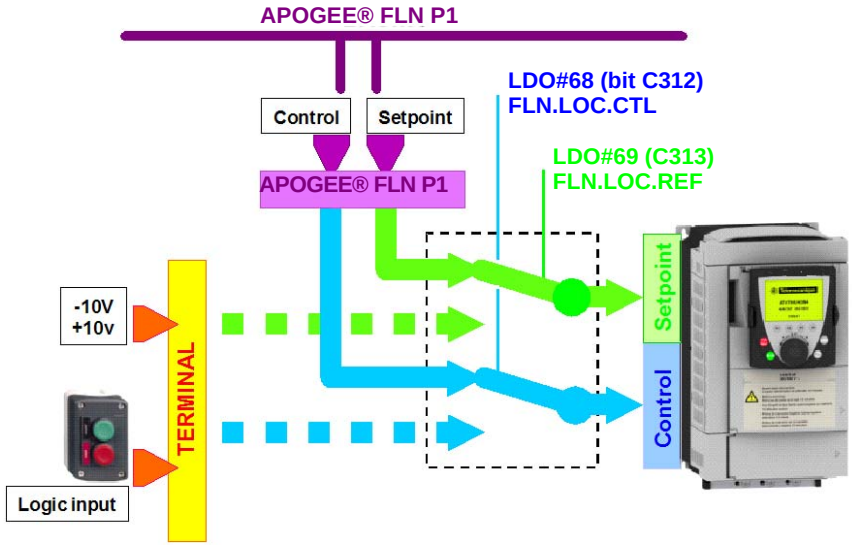
■ Control via APOGEE® FLN P1 or via the terminals

The command and the setpoint both come from APOGEE® FLN P1 or the terminals.
Depending on the configuration, the application functions are or are not used.

Two different cases are described below showing how the setpoint is switched from APOGEE® FLN P1 to the terminals. In the first case, the application functions apply but not in the second one.



An alternate solution can also be used: the setpoint and the command can be switched separately from the network. Two Logical Digital Out (LDO) are dedicated to this function: LDO#68 and LDO#69. These 2 points command C312 and C313 respectively.

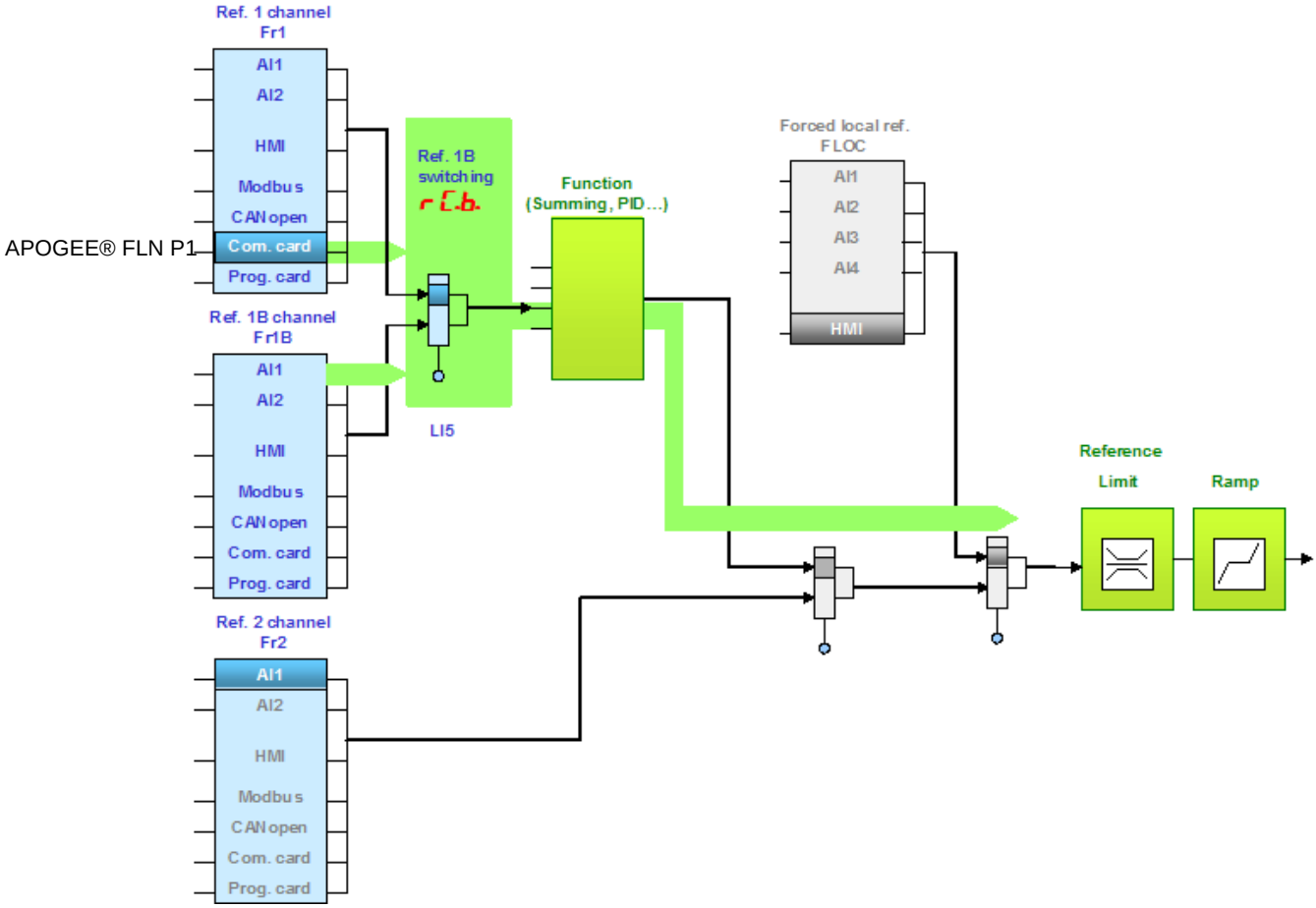


Note:
When using the previous operating mode, it is important that the P1 master controller monitors the drive state (by polling significant points). Therefore when the control and/or the setpoint are switched back to APOGEE® FLN P1, the controller will react properly (when the Drive is switched to local mode, all overridden commands are released).

Important: In this case, a communication interruption message can appear if the connection is interrupted.

Switching of control and setpoint from APOGEE® FLN P1 to the terminals with application function

In this example, logic input LI5 is used to switch the control and the setpoint between APOGEE® FLN P1 and the terminals. When switched to the terminals, the application functions (summing…) remain active.



Configure the following parameters:

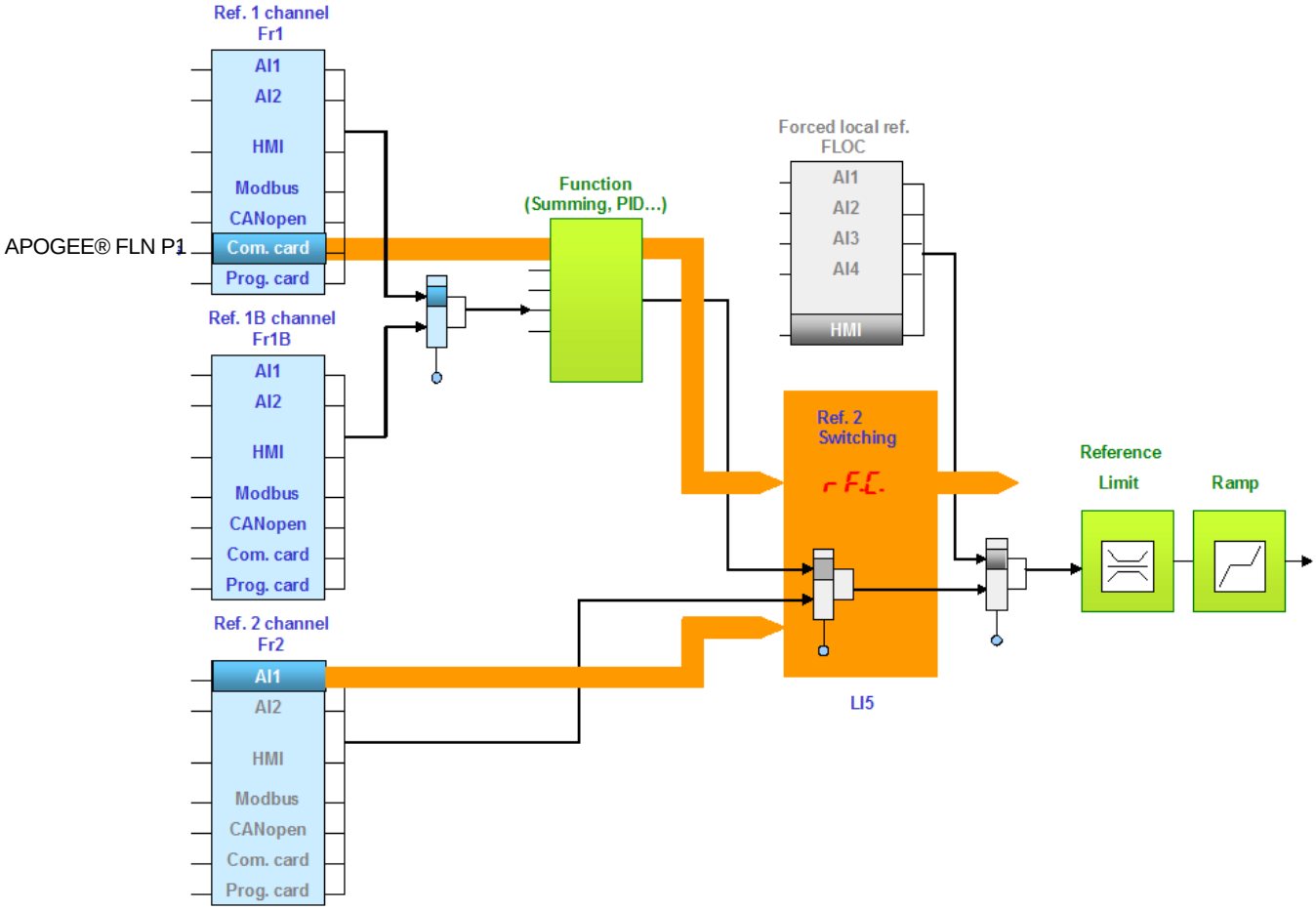
Parameter	Value	Comment
Profile	Separate profile	The command and the setpoint can come from different channels.
Setpoint 1 configuration	Network card	Setpoint 1 comes from APOGEE® FLN P1.
Setpoint 1B configuration	Analog input 1 on the terminals	Setpoint 1B comes from input AI1 on the terminals.
Setpoint switching	Input LI5	Input LI5 switches the setpoint (1 ↔ 1B). C312 (LDO#68) can also be configured for the command switching
Command 1 configuration	Network card	Command 1 comes from APOGEE® FLN P1.
Command 2 configuration	Terminals	Command 2 comes from the terminals.
Command switching	Input LI5	Input LI5 switches the command. C313 (LDO#69) can also be configured for the setpoint

Setpoint 1B is directly connected to the functions of the drive. If the reference is switched to the terminals using Setpoint 1B, the functions that affect the reference (summing, PID, etc) are active.
Configuration via the graphic display terminal or the integrated display terminal:

Menu	Parameter	Value
[1.6 - COMMAND] (CtL-)	[Profile] (CHCF)	[Separate] (SEP)
	[Ref.1 channel] (Fr1)	[Com. card] (nEt)
	[Cmd channel 1] (cd1)	[Com. card] (nEt)
	[Cmd channel 2] (cd2)	[Terminals] (tEr)
	[Cmd switching] (CCS)	[LI5] (LI5)
[1.7 - APPLICATION FUNCT.] (FUn-) [REFERENCE SWITCH]	[Ref.1B channel] (Fr1b)	[Ref. AI1] (AI1) or C312
	[Ref.1B switching] (rCb)	[LI5] (LI5) or C313

Switching of control and setpoint from APOGEE® FLN P1 to the terminals without application function

In this example, logic input LI5 is used to switch the control and the setpoint between APOGEE® FLN P1 and the terminals. When Reference Channel 2 is used for reference switching, the application functions (summing…) are not active.



Configure the following parameters:

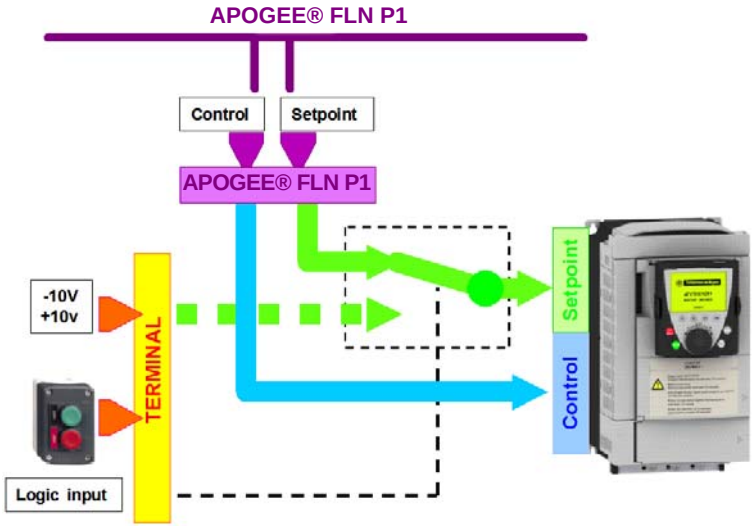
Parameter	Value	Comment
Profile	Not separate profile	The command and the setpoint come from the same channel.
Setpoint 1 configuration	Network card	Setpoint 1 and command 1 comes from APOGEE® FLN P1.
Setpoint 2 configuration	Analog input 1 on the terminals	Setpoint 2 and command 2 comes from input AI1 on the terminals.
Setpoint switching	Input LI5	Input LI5 switches the setpoint (1 ↔ 2) and the command. C313 (LDO#69) can also be configured for the set point switching

Configuration via the graphic display terminal or the integrated display terminal:

Menu	Parameter	Value
[1.6 - COMMAND] (CtL-)	[Profile] (CHCF)	[Not separ.] (SIM): default value
	[Ref.1 chan] (Fr1)	[Com. card] (nEt)
	[Ref.2 chan] (Fr2)	[AI1 ref.] (AI1)
	[Ref.2 switching] (rFC)	[LI5] (LI5) or [C313] C313

■ Control via APOGEE® FLN P1 and setpoint switching

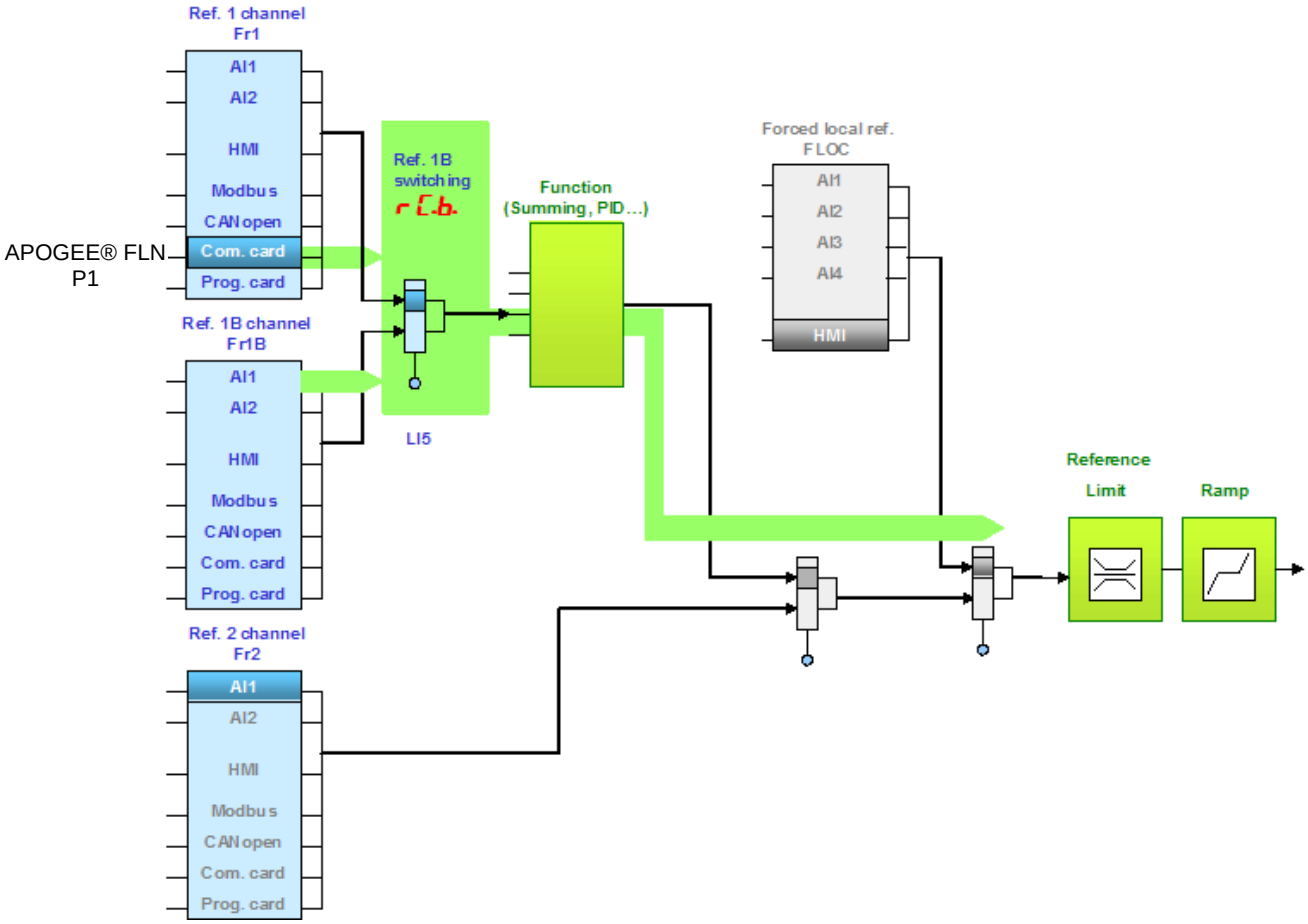
The command comes from APOGEE® FLN P1.
The setpoint comes either from APOGEE® FLN P1 or from the terminals.
Depending on the configuration, the application functions are enabled or disabled.



Note:
When using the previous operating mode, it is important that the P1 master controller monitors the drive state (by polling significant points). Therefore when the control and/or the setpoint are switched back to APOGEE® FLN P1, the controller will react properly (when the drive is switched to local mode, overridden commands are released).

Control via APOGEE® FLN P1 and switching of the setpoint at the terminals with application function

In this example, the command comes from APOGEE® FLN P1. logic input LI5 is used to switch the setpoint between APOGEE® FLN P1 and the terminals. When switched to the terminals, the application functions (summing…) remain active.



Configure the following parameters:

Parameter	Value	Comment
Profile	Separate profile	The command and the setpoint can come from different channels.
Setpoint 1 configuration	Network card	Setpoint 1 comes from APOGEE® FLN P1.
Setpoint 1B configuration	Analog input 1 on the terminals	Setpoint 1B comes from input AI1 on the terminals.
Setpoint switching	Input LI5	Input LI5 switches the reference (1 ↔ 1B). C313 (LDO#69) can also be configured for the set point switching.
Command 1 configuration	Network card	Command 1 comes from APOGEE® FLN P1.
Command switching	Channel 1	Channel 1 is the command channel.

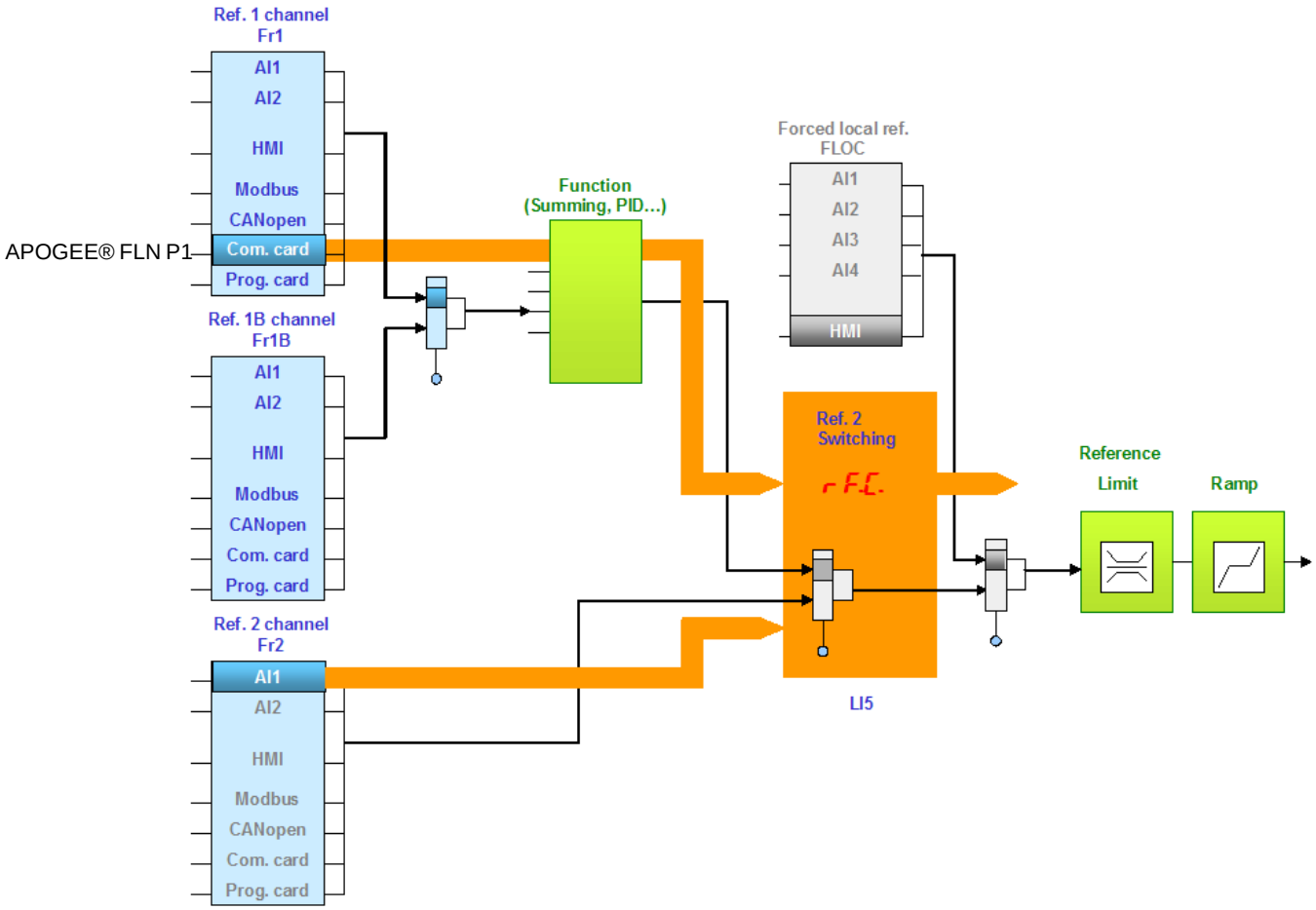
Reference 1B is directly connected to the functions of the drive. If the reference is switched to the terminals using Setpoint 1B, the functions that affect the reference (summing, PID, etc) are active.

Configuration via the graphic display terminal or the integrated display terminal:

Menu	Parameter	Value
[1.6 - COMMAND] (CtL-)	[Profile] (CHCF)	[Separate] (SEP)
	[Ref.1 channel] (Fr1)	[Com. card] (nEt)
	[Cmd channel 1] (cd1)	[Com. card] (nEt)
	[Cmd switching] (CCS)	[ch1 active] (Cd1)
[1.7 - APPLICATION FUNCT.] (FUn-) [REFERENCE SWITCH]	[Ref.1B channel] (Fr1b)	[Ref. AI1] (AI1)
	[Ref.1B switching] (rCb)	[LI5] (LI5) or [C313] C313

Control via APOGEE® FLN P1 and switching of the setpoint at the terminals with application function

In this example, the command comes from APOGEE® FLN P1. logic input LI5 is used to switch the setpoint between APOGEE® FLN P1 and the terminals. When switched to the terminals, the application functions (summing…) are not active.



Configure the following parameters:

Parameter	Value	Comment
Profile	Separate profile	The command and the setpoint can come from different channels.
Setpoint 1 configuration	Network card	Setpoint 1 comes from APOGEE® FLN P1.
Setpoint 2 configuration	Analog input 1 on the terminals	Setpoint 2 comes from input AI1 on the terminals.
Setpoint switching	Input LI5	Input LI5 switches the setpoint (1↔ 2). C313 (LDO#69) can also be configured for the set point switching.
Command 1 configuration	Network card	Command 1 comes from APOGEE® FLN P1.
Command switching	Channel 1	Channel 1 is the command channel.

Setpoint 1B is connected to the functions (Summing, etc) that remain active even after switching.

Configuration via the graphic display terminal or the integrated display terminal:

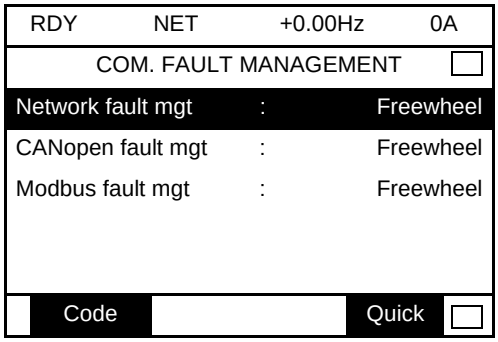
Menu	Parameter	Value
[1.6 – COMMAND] (CtL-)	[Profile] (CHCF)	[Separate] (SEP)
	[Ref.1 chan] (Fr1)	[Com. card] (nEt)
	[Ref.2 chan] (Fr2)	[AI1 ref.] (AI1)
	[Ref 2 switching] (rFc)	[LI5] (LI5) or [C313] C313
	[Cmd channel 1] (Cd1)	[Com. card] (nEt)
	[Cmd switching] (CCS)	[ch1 active] (Cd1)

9. Configuration

9. 3. Communication configuration

An APOGEE® FLN P1 trip is triggered if the APOGEE® FLN P1 card does not receive any APOGEE® FLN P1 messages (regardless of address) at its address within a predefined time period (timeout defined by tLP). APOGEE® FLN P1 request types are taken into account (read, write, etc.).
The response of the drive in the event of a APOGEE® FLN P1 communication interruption can be configured.

Configuration can be performed using the graphic display terminal or integrated display terminal using the [Network fault mgt] (CLL) parameter in the [1.8 FAULT MANAGEMENT] (FLt-) menu, [COM. FAULT MANAGEMENT] (CLL-) submenu.



The values of the [Network fault mgt] (CLL) parameter, which trigger a [Com. network] (CnF) condition, are:

Value	Meaning
[Freewheel] (YES)	Freewheel stop (factory setting)
[Ramp stop] (rMP)	Stop on ramp
[Fast stop] (FSt)	Fast stop
[DC injection] (dCI)	DC injection stop

The values of the [Network fault mgt] (CLL) parameter, which do not trigger a [Com. network] (CnF) condition, are:

Value	Meaning
[Ignore] (nO)	Condition ignored
[Per STT] (Stt)	Stop according to configuration of [Type of stop] (Stt).
[fallback spd] (LFF)	Switch to fallback speed, maintained as long as the condition is present and the run command is not disabled.
[Spd maint.] (rLS)	The drive maintains the speed at the time the fault was detected, as long as the condition persists and the run command has not been removed.

The fallback speed can be configured via the [Fallback speed] (LFF) parameter in the [1.8 – FAULT MANAGEMENT] (FLt-) menu.

9. 4. Monitored parameters

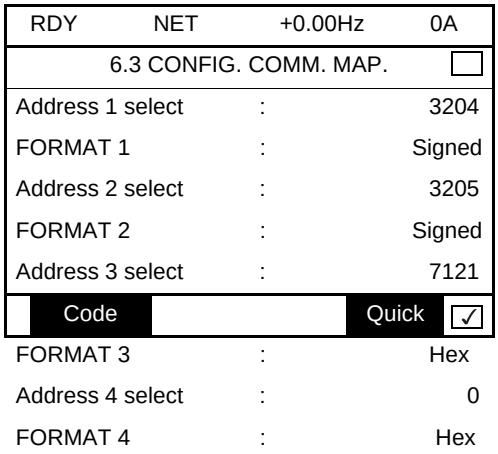
It is possible to select up to 4 parameters to display their values in the [1.2 - MONITORING] menu ([COMMUNICATION MAP] submenu) on the graphic display terminal.

The selection is made via the [6 – MONITOR CONFIG.] menu ([6.3 - CONFIG. COMM. MAP] submenu).

Each parameter [Address 1 select] ... [Address 4 select] can be used to choose the logic address of the parameter. Select an address of zero to disable the function.

In the example given here, the monitored words are:

- Parameter 1 = Motor current (LCr): logic address 3204; signed decimal format
- Parameter 2 = Motor torque (Otr): logic address 3205; signed decimal format
- Parameter 3 = Last detected fault occurred (LFt): logic address 7121; hexadecimal format
- Disabled parameter: address 0; default format: hexadecimal format



One of the three display formats below can be assigned to each monitored word:

Format	Range	Terminal display
Hexadecimal	0000 ... FFFF	[Hex]
Signed decimal	-32,767 ... 32,767	[Signed]
Unsigned decimal	0 ... 65,535	[Unsigned]

10. Diagnostics

10. 1. Checking the address

On the graphic display terminal or integrated display terminal, check the address that has been set correctly using the [Address] (Adr C) parameter in the [1.9 COMMUNICATION] (COM-) menu, [P1] (NET) submenu.

10. 2. Checking the communication

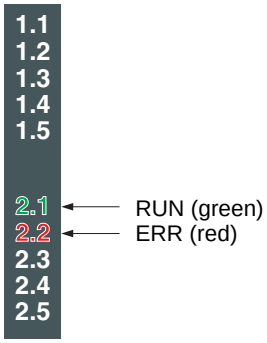
On the graphic display terminal, in the [1.2 - MONITORING] (SUP) menu [COMMUNICATION MAP] (CNM-) menu [DIAG NETWORK] (nET):

Contents of the DIAG NETWORK sub menu with a APOGEE® FLN P1 communication board:

Parameter	Comment
[Address] (Adr C)	Displays the device's address
[Frame counter] (tFC)	Displays the total number of frames received by the communication card since the last power ON.
[Invalid Frame counter] EFC)	Displays the total number of bad frames received by the communication card since the last power ON.

10. 3. LEDs

The APOGEE® FLN P1 card has 2 LEDs, RUN and ERR, which are visible through the drive cover.

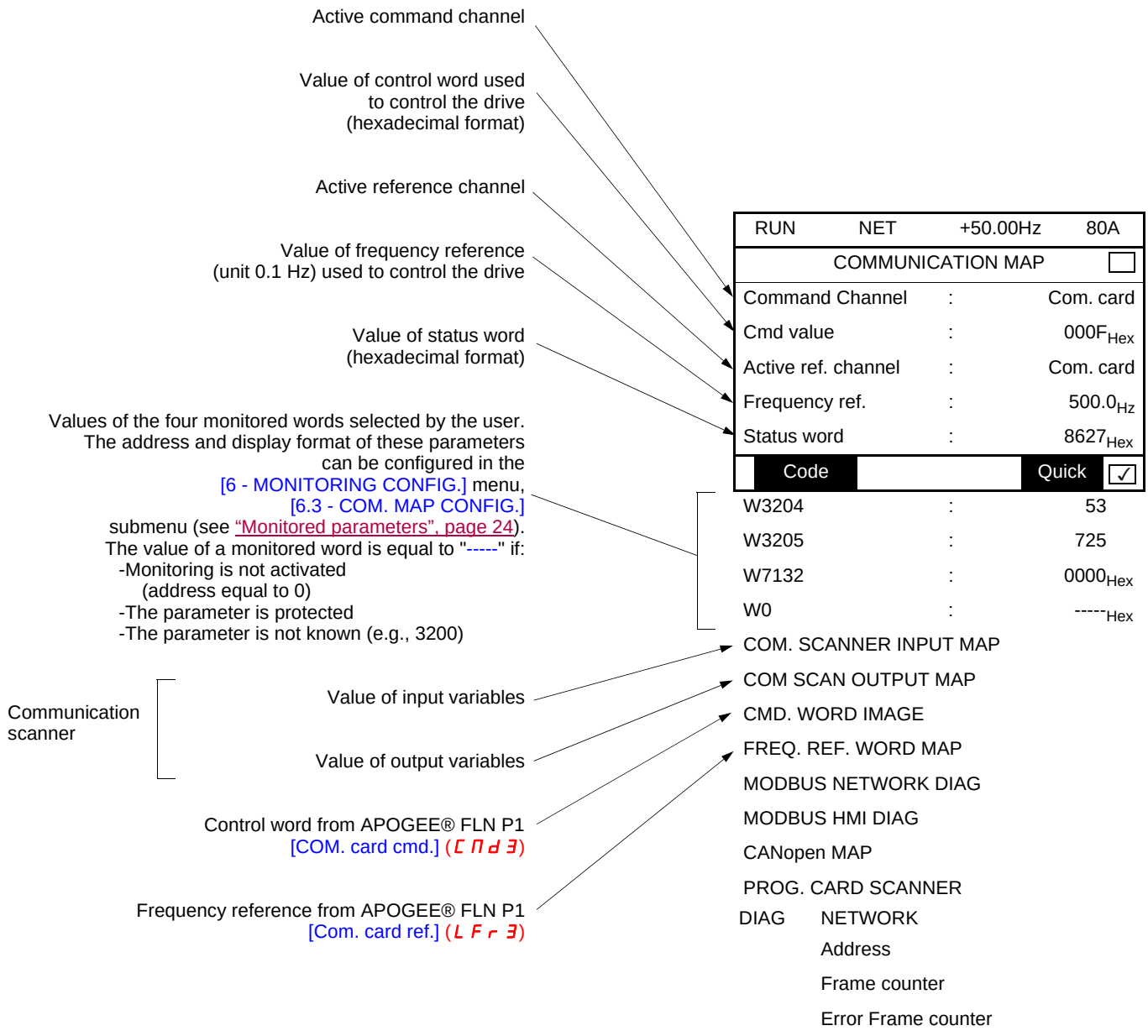


■ LEDs Indication Table

LED	Comment
RUN LED: OFF ERR LED: Flashing 5 times in 1 second	APOGEE® FLN P1 card inoperable.
RUN LED: OFF ERR LED: Flashes 3 times in 2 seconds, Off for 1 second	Communication loss detected. Confirm the network condition and connection of the network cable.
RUN LED: ON ERR LED: On for 0.5 seconds, Off for 0.5 seconds	Invalid configuration detected.
RUN LED: Flashing ERR LED: -	Valid message received for this node.
RUN LED: - ERR LED: Flashing	Invalid message received (any node)
RUN LED: OFF ERR LED: OFF	No communication with the drive (e.g. : drive power is off) or the baud rate is set incorrectly.

10. 4. Control - Command

On the graphic display terminal only, the [1.2 - MONITORING] menu ([COMMUNICATION MAP] submenu) can be used to display control-signal diagnostic information between the drive and the master:



10. 5. Communication interruptions

APOGEE® FLN P1 communication interruptions are indicated by the red ERR LED on the APOGEE® FLN P1 card.

In the factory default configuration, a communication timeout will trigger a resettable [Com. network] (CnF) condition and initiate a freewheel stop.

It is possible to change the response of the drive in the event of a APOGEE® FLN P1 communication interruption (see the Configuration section).
- [Com. network] (CnF) condition (freewheel stop, stop on ramp, fast stop or DC injection braking stop)
- No [Com. network] (CnF) condition ignore, (stop, maintain, fallback)

The Parameters Manual contains a detailed description of how to manage communication interruptions (see the "Communication monitoring" section).
- Following initialization (power-up), the drive checks that at least one command or reference parameter has been written for the first time by APOGEE® FLN P1.
- Then, if a communication interruption occurs on APOGEE® FLN P1, the drive will react according to the configuration condition (maintain, fallback, etc.).

10. 6. Option card hardware conditions

The [Internal com. link] (ILF) appears when the following occur:
- Hardware related issue on the APOGEE® FLN P1 card
- Communication interruption between the APOGEE® FLN P1 card and the drive

The drive responds to an [Internal com. link] (ILF) message by going into a freewheel stop mode. This event cannot be reset without cycling power to the equipment.

Two diagnostic parameters can be used to obtain more detailed information about the origin of the [internal com. link] (ILF) event:
- [Internal link fault 1] (ILF1) if the event has occurred on option card no. 1 (installed directly on the drive)
- [Internal link fault 2] (ILF2) if the event has occurred on option card no. 2 (installed on top of option card no. 1)

The APOGEE® FLN P1 card can be in position 1 or 2.

The [Internal link fault 1] (ILF1) and [Internal link fault 2] (ILF2) parameters can only be accessed on the graphic display terminal in the [1.10 DIAGNOSTICS] (DGt-) menu, [MORE FAULT INFO] (AF1-) submenu.

Value	Description of the values of the [Internal link fault 1] (ILF1) and [Internal link fault 2] (ILF2) parameters
0	Okay
1	Loss of internal communication with the drive
2	Potential hardware problem detected
3	Potential problem in the EEPROM checksum
4	EEPROM analysis needed
5	Flash memory analysis needed
6	RAM memory analysis needed
7	NVRAM memory analysis needed
8	Analog input analysis needed
9	Analog output analysis needed
10	Logic input analysis needed
11	Logic output analysis needed
101	Unknown card
102	Exchange problem on the drive internal bus
103	Time out on the drive internal bus (500 ms)

11. Network objects

11. 1. Logical Analog Input (LAI) Summary

Logical Analog Input (LAI) points are used for monitoring drive status items such as output frequency, current and voltage. The APOGEE® FLN P1 card supports 24 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

Poin Number	Point Name	Factory Default	Eng. Units	Slope	Intercept	Min	Max
03	FREQ OUTPUT	0	HZ	0.1	0	0	32767
04	PCT OUTPUT	0	PCT	0.1	0	0	32767
05	SPEED	0	RPM	1	0	0	32767
06	CURRENT	0	A	0.1	0	0	32767
07	TORQUE	2000	PCT	0.1	-200	0	32767
08	POWER	0	KW	0.1	0	0	32767
09	DRIVE TEMP	0	PCT	0.1	0	0	32767
10	DRIVE KWH	0	kWH	1	0	0	32767
11	DRIVE MWH	0	MWH	1	0	0	32767
12	RUN TIME	0	H	1	0	0	32767
13	DC BUS VOLT	0	V	1	0	0	32767
14	OUTPUT VOLT	0	V	1	0	0	32767
15	PRC PID FBCK	0	PCT	0.1	0	0	32767
16	PRC PID DEV	0	PCT	0.1	N/A	0	32767
17	MOTOR TEMP	0	PCT	0.1	N/A	0	32767
82	AI 1 ACTUAL	0	PCT	0.1	0	0	32767
83	AI 2 ACTUAL	0	PCT	0.1	0	0	32767
84	AO 1 ACTUAL	0	PCT	0.1	0	0	32767
85	AO 2 ACTUAL	0	PCT	0.1	0	0	32767
88	ALARM WORD 1*	0	-	1	0	0	32767
89	ALARM WORD 2*	0	-	1	0	0	32767
90	LAST FAULT*	0	-	1	0	0	32767
91	PREV FAULT 1*	0	-	1	0	0	32767
92	PREV FAULT 2*	0	-	1	0	0	32767

* Refer to the ATV61 programming manual.

11. Network objects

■ LAI Point Descriptions

Logical Analog Input (LAI) Point Descriptions.

Point Number	Drive relative parameter	Point Name	Description
03	Adrc	FREQ OUTPUT	The output frequency applied to the motor, in Hertz.
04	-	PCT OUTPUT	The ratio of the output frequency or speed to the corresponding base frequency.
05	rFr	SPEED	The calculated speed of the motor, in RPM.
06	LCr	CURRENT	The measured output current.
07	Otr	TORQUE	The calculated output torque of the motor as a percentage of nominal torque.
08	OPrP	POWER	The measured output power in kW.
09	hd	DRIVE TEMP	The calculated thermal state of the drive.
10	IPhr	DRIVE KWH	The drive's cumulative power consumption in kilowatt-hours.This value may be reset by commanding FLN point 49, RESET KWH.
11	IPh	DRIVE MWH	The drive's cumulative power consumption in megawatt-hours. This value may be reset by commanding FLN point 49, RESET KWH.
12	rth	RUN TIME	The drive's cumulative run time in hours.
13	ULn	DC BUS VOLT	The DC bus voltage level of the drive.
14	UoP	OUTPUT VOLT	The AC output voltage applied to the motor.
15	rPF	PRC PID FBCK	The ratio of PID feedback signal to the corresponding vl(base frequency).
16	-	(PRC PID DEV)	Reserved
17	-	(MOTOR TEMP)	Reserved
82	Ai1L	AI 1 ACTUAL	Indicates the input level of analog input 1.
83	Ai2L	AI 2 ACTUAL	Indicates the input level of analog input 2.
84	Ao1L	AO 1 ACTUAL	Indicates the output level of analog output1terminal.
85	Ao2L	AO 2 ACTUAL	Indicates the output level of analog output 2 terminal.
88	ur1	ALARM WORD 1	This point is a bit-field indicating active alarms in the drive.
89	ur2	ALARM WORD 2	This point is a bit-field indicating active alarms in the drive.
90	LFt	LAST FAULT	This point is first in the drive's detected fault log and indicates the most recent interruption.
91	dP1	PREV FAULT 1	This point is second in the drive's detected fault log and indicates the previous interruption declared.
92	dP2	PREV FAULT 2	This point is last in the drive's detected fault log and indicates the oldest interruption in the log.

11. 2. 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 card supports 11 different logical analog output points (7 of them are for the ATV61 parameters and commands, while other 4 special points 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.

Logical Analog Output (LAO) Summary

Point Number	Point Name	Factory Default	Eng. Units	Slope	Intercept	Min	Max
01	CTLR ADDRESS	99	-	1	0	0	99
02	APPLICATION	2748	-	1	0	0	32767
20	OVRD TIME	1	H	1	0	0	255
30	CURRENT LIM	0	A	0.1	0	0	32767
31	ACCEL TIME 1	Reserved					
32	DECEL TIME 1	Reserved					
46	AO 1 COMMAND	0	PCT	0.1	0	0	32767
47	AO 2 COMMAND	0	PCT	0.1	0	0	32767
50	PRC PID GAIN	Reserved					
51	PRC PID ITIM ***	Reserved					
52	PRC PID DTIM	Reserved					
53	(PRC PID DFIL)	Reserved					
60	INPUT REF1 *	0	PCT	0.1	0	0	32767
61	INPUT REF2	Reserved					
66	SPD OUT MIN	0	PCT	0.1	0	0	32767
67	SPD OUT MAX	1000	PCT	0.1	0	0	32767
95	MBOX PARAM **	-	-	1	0	0	32767
96	MBOX DATA **	-	-	1	0	0	32767
99	ERROR STATUS	-	-	1	0	0	255

** About MBOX function, refer to chapter 12 : "Message function box"

■ LAO Point Descriptions

Logical Analog Output (LAO) Point Descriptions

Point Number	Drive relative parameter	Point Name	Description
01	AdrC	CTLR ADDRESS	The FLN address of the drive. It can be set from the FLN network and with the local HMI, graphic keypad or the comissioning software.
02	-	APPLICATION	The Application ID for APOGEE® FLN P1 card
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.
30	cLI	CURRENT LIM	Sets the output current limit of the drive. The value is memorized if it is written by P1 network.
46	AoIr	AO 1 COMMAND	Controls analog output 1(AO1). If this output is not assigned to a drive function.
47	Ao2r	AO 2 COMMAND	Controls analog output 2(AO2). If this output is not assigned to a drive function.
60	Based on : LFr/ tFr	INPUT REF1	Drive speed setpoint from the network
66	Based on : LSP/ tFr	SPD OUT MIN	Sets the minimum output speed of the drive as a percentage of the motor nominal rating. The value is memorized if it is written by P1 network.
67	Based on : HSP/ tFr	SPD OUT MAX	Sets the maximum output speed of the drive as a percentage of the motor nominal rating. The value is memorized if it is written by P1 network.
95	-	MBOX PARAM	Sets the parameter to be used by the mailbox function. (Refer to chapter 12)
96	-	MBOX DATA	Sets or indicates the data value of the mailbox function. (Refer to chapter 12)
99	-	STATUS	1 of the 5 mandatory FLN points required for compatibility with Siemens control systems. It has no functionality in the drive application.

11. 3. Logical Digital Input (LDI) Summary

Logical Digital Input (LDI) points are used for drive status monitoring such as terminal ON/OFF conditions and fault status. The APOGEE® FLN P1 card supports 24 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 override active.

Logical Digital Input (LDI) Summary

Point Number	Point Name	Factory Default	Slope	Intercept	ON (1) Text	OFF (0) Test
21	FWD.REV	FWD	1	0	REV	FWD
23	STOP.RUN	STOP	1	0	RUN	STOP
25	EXT1.2 ACT	Reserved				
27	DRIVE READY	NOTRDY	1	0	READY	NOTRDY
28	AT SETPOINT	NO	1	0	YES	NO
33	HANDAUTO ACT	AUTO	1	0	HAND	AUTO
36	FLN LOC ACT	AUTO	1	0	FLN	AUTO
37	CTL SRC	Reserved				
38	FLN REF1 SRC	Reserved				
39	FLN REF2 SRC	Reserved				
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
73	DI 4 ACTUAL	OFF	1	0	ON	OFF
74	DI 5 ACTUAL	OFF	1	0	ON	OFF
75	DI 6 ACTUAL	OFF	1	0	ON	OFF
76	DO 1 ACTUAL	OFF (1)	1	0	ON	OFF
77	DO 2 ACTUAL	OFF (1)	1	0	ON	OFF
78	DO 3 ACTUAL	OFF (2)	1	0	ON	OFF
79	DO 4 ACTUAL	OFF (2)	1	0	ON	OFF
80	DO 5 ACTUAL	Reserved	1	0	ON	OFF
81	DO 6 ACTUAL	Reserved	1	0	ON	OFF
86	OK.ALARM	OK	1	0	ALARM	OK
93	OK.FAULT	OK	1	0	FAULT	OK

(1) If IO basic card (VW3A3201) has been inserted.
(2) If IO extended card (VW3A3202) has been inserted.

11. Network objects

■ LDI Point Descriptions

Logical Digital Input (LDI) Point Descriptions

Point Number	Drive relative parameter	Point Name	Description
21	EtA bit 15	FWD.REV	Indicates the rotational direction of the motor, regardless of control source.
23	EtA bit 1	STOP.RUN	Indicates the run status of the drive, regardless of control source.
27	EtA bit 0 & 4=1	DRIVE READY	Indicates the drive is ready to accept a run command.
28	EtA bit 10	AT SETPOINT	Indicates the drive has reached its commanded setpoint
33	EtA bit 9	HANDAUTO ACT	Indicates whether the drive is in local (HAND) or remote (AUTO) control.
36	ccS = C312 or rCb = C313	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 overrides control from its normal source and places in under FLN control.Note that the HAND mode of the panel has priority over FLN local control.
70	iL IL bit 0	DI 1 ACTUAL	Indicates the status of logical Input 1.
71	iL IL bit 1	DI 2 ACTUAL	Indicates the status of logical Input 2.
72	iL IL bit 2	DI 3 ACTUAL	Indicates the status of logical Input 3.
73	iL IL bit 3	DI 4 ACTUAL	Indicates the status of logical Input 4.
74	iL IL bit 4	DI 5 ACTUAL	Indicates the status of logical Input 5.
75	iL IL bit 5	DI 6 ACTUAL	Indicates the status of logical Input 6.
76	oL IL bit 0	DO 1 ACTUAL	Indicates the status of logical output 1 (1).
77	oL IL bit 1	DO 2 ACTUAL	Indicates the status of logical output 2 (1).
78	oL IL bit 2	DO 3 ACTUAL	Indicates the status of logical output 3 (2).
79	oL IL bit 3	DO 4 ACTUAL	Indicates the status of logical output 4 (2).
80	oL IL bit 4	DO 5 ACTUAL	Reserved
81	oL IL bit 5	DO 6 ACTUAL	Reserved
86	-	OK.ALARM	Indicates the current alarm state of the drive.
93	EtA bit 3	OK.FAULT	Indicates the current state of the drive.

(1) If IO basic card (VW3A3201) has been inserted.
(2) If IO extended card (VW3A3202) has been inserted.

11. 4. Logical Digital Output (LDO) Summary

Logical Digital Output (LDO) points are used for executing drive commands such as RUN/STOP and reset. The APOGEE® FLN P1 card supports 16 different logical digital output points (15 among them 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.

Logical Digital Output (LDO) Summary

Point Number	Point Name	Factory Default	Slope	Intercept	ON (1) Text	OFF (0) Test
22	CMD FWD.REV	FWD	1	0	REV	FWD
24	CMD STP.STRT	STOP	1	0	RUN	STOP
26	EXT1.2 CMD	Reserved				
29	DAY.NIGHT	DAY	1	0	NIGHT	DAY
40	DO 1 COMMAND	OFF (1)	1	0	ON	OFF
41	DO 2 COMMAND	OFF (1)	1	0	ON	OFF
42	DO 3 COMMAND	OFF (2)	1	0	ON	OFF
43	DO 4 COMMAND	OFF (2)	1	0	ON	OFF
44	DO 5 COMMAND	Reserved	1	0	ON	OFF
45	DO 6 COMMAND	Reserved	1	0	ON	OFF
48	RST RUN TIME	NO	1	0	RESET	NO
49	RESET KWH	NO	1	0	RESET	NO
59	LOCK PANEL	Reserved				
68	FLN LOC CTL	AUTO	1	0	FLN	AUTO
69	FLN LOC REF	AUTO	1	0	FLN	AUTO
94	RESET FAULT	NO	1	0	RESET	NO
97	MBOX READ	DONE	1	0	READ	DONE
98	MBOX WRITE	DONE	1	0	WRITE	DONE

(1) If IO basic card (VW3A3201) has been inserted.
(2) If IO extended card (VW3A3202) has been inserted.

11. Network objects

■ LDO Point Descriptions

Logical Digital Output (LDO) Point Descriptions

Point Number	Drive relative parameter	Point Name	Parameter
22	-	CMD FWD.REV	Acts on the CiA402 drive state machine.For more details, please refer to the programming manual
24	-	CMD STP.STRT	Acts on the CiA402 drive state machine.For more details, please refer to the programming manual
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.
40	OL Ir bit 0	DO 1 COMMAND	Logical output 1 (1)
41	OL Ir bit 1	DO 2 COMMAND	Logical output 2 (1)
42	OL Ir bit 2	DO 3 COMMAND	Logical output 3 (2)
43	OL Ir bit 3	DO 4 COMMAND	Logical output 4 (2)
44	OL Ir bit 8	DO 5 COMMAND	Reserved
45	OL Ir bit 9	DO 6 COMMAND	Reserved
48	rPr = 2	RST RUN TIME	Reset run time counter
49	rPr = 5	RESET KWH	Commanded by the FLN network to reset the cumulative kilowatt-hour and megawatt-hours counter (1 = RESET, 0 = NO).
68	C312	FLN LOC CTL	Commanded from the FLN network to temporarily "steal" start/stop control of the drive from its normal source and place it under FLN network control. Note : this function is active if the control switching has been configured to C312 (see chapter “Control”, page 16)
69	C313	FLN LOC REF	Commanded from the FLN network to temporarily "steal" input setpoint control of the drive from its normal source and place it under the FLN network control. Note : this function is active if the control switching has been configured to C313 (see chapter “Control”, page 16)
94	CMd bit 7	RESET FAULT	Command from the FLN network to reset a 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.
97	-	MBOX READ	Refer to chapter “Message box function points”, page 35 .
98	-	MBOX WRITE	Refer to chapter “Message box function points”, page 35.

(1) If IO basic card (VW3A3201) has been inserted.
(2) If IO extended card (VW3A3202) has been inserted.

12. Message box function points

12. 1. ATV61 Parameter access point table

Using below APOGEE® FLN P1 points, drive parameters can be read and written.

Point Number	Point Type	Point Name	Note
95	LAO	MBOX PARAM	The communication number (hex.) of the access parameter is set.
96	LAO	MBOX DATA	The parameter's data. The data unit depends on the parameter specification. Refer to the drive instruction manual.
97	LDO	MBOX READ	The parameter value specified by MBOX PARAM is read to MBOX DATA by setting 1(READ). When they were read normally, these points return to 0. When not read normally, these points remain 1.
98	LDO	MBOX WRITE	Data of MBOX DATA is written in at a parameter of MBOX PARAM in 1(WRITE) by a set. When written normally, these points return to 0. When unable to be written normally, these points remain 1.

Example 1) **Read the acceleration time (ACC, Modbus address: 9001 = 16#2329)**

- Write 9001* as the communication number to MBOX PARAM (LAO #95).
  * decimal number
- Write "1" to MBOX READ (LDO #97).
- Confirm whether it was read in MBOX READ (LDO #97).
- The read value can be read in MBOX DATA (LAO #96). Note: The unit is 0.1 Hz.

Example 2) **Write "55.0Hz" to High speed (HSP Modbus address: 3104 = 16#C20)**

- Write 3104 as the communication number to MBOX PARAM (LAO #95).
- Write "550" to MBOX WRITE (LDO #98).
  * 550 = 55.00Hz, unit is 0.1Hz
- Write "1" to MBOX WRITE (LDO #98).

12. 2. FLN P1 Status Code

When an operation cannot be completed as a result of a P1 command, an error code is returned with the NAK.
Below is a list of possible error codes that can be returned by a FLN device.

FLN P1 Status Code

Status Code	Description
0x00D7	Operator priority too low. A number of situations can return this status 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 card does not support these commands.

13. Reports

The APOGEE® FLN P1 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 are 2 examples of reports:

```
01/31/2002 THU              TEC REPORT DISPLAY REPORT                    03:28
-------------------------------------------------------------------------------
Search for <ATV61:STARTUP>
TEC name
   :Suffix (Description)                      Value          State   Priority
-------------------------------------------------------------------------------
ATV61
[21] :FWD.REV                                 FWD            -N-       NONE
[22] :CMD FWD.REV                             FWD            -N-       OVRD
[23] :STOP.RUN                                RUN            -N-       NONE
[24] :CMD STP.STRT                            RUN            -N-       OVRD
[25] :EXT1.2 ACT                              OFF            -N-       NONE
[26] :EXT1.2 CMD                              OFF            -N-       NONE
[36] :FLN LOC ACT                             OFF            -N-       NONE
[60] :INPUT REF1                              100.0 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-       NONE

End of report
```

```
01/31/2002 THU              TEC REPORT DISPLAY REPORT                    03:30
-------------------------------------------------------------------------------
Search for <ATV61:PROCESS PID>
TEC name
   :Suffix (Description)                      Value          State   Priority
-------------------------------------------------------------------------------
ATV61
[15] :PRC PID FBCK                            0.0 PCT        -N-       NONE
[16] :PRC PID DEV                             0.0 PCT        -N-       NONE
[50] :PRC PID GAIN                            1.0 PCT        -N-       NONE
[51] :PRC PID ITIM                            50.0 S         -N-       NONE
[52] :PRC PID DTIM                            0.0 S          -N-       NONE
[53] :PRC PID DFIL                            1.0 S          -N-       NONE
[60] :INPUT REF1                              100.0 PCT      -N-       OVRD
[61] :INPUT REF2                              0.0 PCT        -N-       NONE
[82] :AI 1 ACTUAL                             61.5 PCT       -N-       NONE
[83] :AI 2 ACTUAL                             13.0 PCT       -N-       NONE
[84] :AO 1 ACTUAL                             0.0 PCT        -N-       NONE
[85] :AO 2 ACTUAL                             0.0 PCT        -N-       NONE

End of report
```