Supplemental Instructions

CONTENTS

SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment.

Understand the signal words DANGER, WARNING, CAUTION, and NOTE. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies hazards which **could** result in personal injury or death. CAUTION is used to identify unsafe practices, which **may** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

⚠ DANGER

NEVER enter an enclosed fan cabinet or reach into a unit while the fan is running.

Failure to heed this warning will result in severe personal injury or death.

⚠ WARNING

LOCK OPEN AND TAG the fan motor power disconnect switch before working on a fan. Take fuses with you and note removal on tag.

LOCK OPEN AND TAG the electric heat coil power disconnect switch before working on or near heaters (if equipped).

Failure to follow these safety precautions could lead to severe personal injury or death.

INTRODUCTION

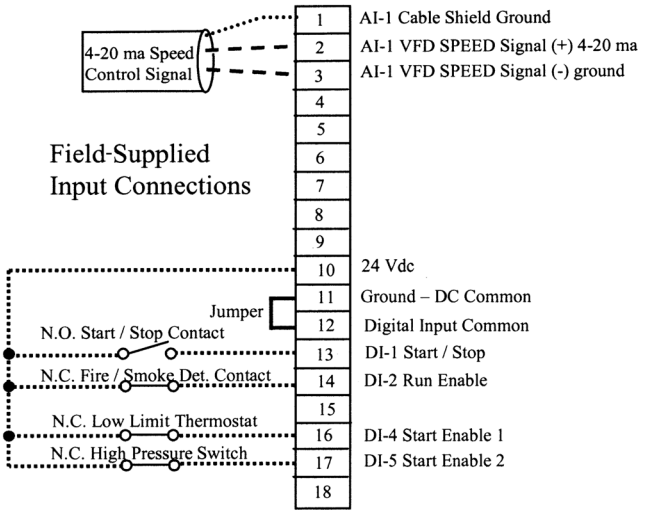
When variable frequency drive (VFD) is factory-installed, it is wired to the motor and fully tested before shipment. Drive programming is also done at the factory, including electronic overload, which is programmed for the motor FLA. Refer to Tables 2 and 3.

Open the VFD front cover and the fan section access door to check for any damage before proceeding.

Wiring

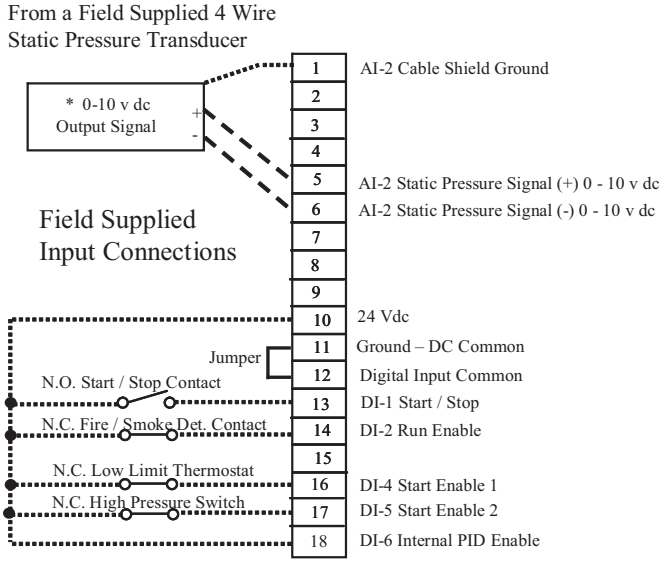
1. Select a suitable location in the bottom of the VFD to connect field-supplied power source.
2. Remove the appropriate size knockout using a suitable knockout punch tool. Do NOT use a drill; metal shavings will damage the drive.
3. Connect the field-supplied conduit to the VFD enclosure.
4. Refer to the wiring diagram supplied with the VFD connect the line voltage power source to the line voltage terminals (L1, L2, L3) as shown.
5. Refer to the factory-supplied voltage warning label and verify that the power source is correct.

6. Connect the ground wire to the grounding lug provided on the bottom of the VFD.
7. Select another suitable location on the bottom of the VFD to connect the field-supplied control wiring.
8. Locate and use one of the unused knockouts on the VFD housing and connect the control wiring conduit. Refer to Fig. 1 and 2 for field control wiring connections.



NOTES:
1. All conductors are no. 22 AWG (American Wire Gage) minimum.
2. Install jumpers if fire/smoke detector, low limit thermostat, or high pressure switch are not required.

Fig. 1 — Field-Supplied Control Wiring for VFD Speed Control



*Acceptable transducer output voltage ranges are 0-10 vdc, 0-5 vdc, and 2-10 vdc. Default sensor range is 0-10 vdc from factory. Use parameters 12.29 to configure sensor low voltage and parameter 12.30 to configure sensor high voltage.

NOTES:
1. All conductors are no. 22 AWG (American Wire Gage) minimum.
2. Install jumpers if fire/smoke detector, low limit thermostat, or high pressure switch are not required.
3. Program static pressure control set point using parameter 40.21 in volts vdc.

Fig. 2 — Field Wiring for Stand-Alone Static Pressure Control with 4-Wire Static Pressure Transducer (Voltage Output)

START-UP AND TEST

1. Close and secure the fan access door and the VFD cover.
2. Apply power and allow drive to initialize.
3. If fan is a direct drive type, then ensure VFD has been programmed with the correct values for parameters 30.12 and 30.14 to maximum fan speed and maximum VFD output frequency to limit motor speed to the fan maximum.

⚠CAUTION

Failure to ensure parameters 30.12 and 30.14 are correct can result in damage to the fan wheel.

4. Verify max fan rpm from label on fan sled.
5. Verify motor Hz and nominal operating speed on motor nameplate.
6. Calculate the maximum frequency output from the VFD. Maximum frequency = motor frequency (Hz) * fan maximum speed (rpm) ÷ motor nominal operating speed (rpm).
7. Verify that parameter 30.12 (maximum fan speed) has been set to match value on the fan label.
8. Select MENU to enter the main menu.
9. Select PARAMETERS with the UP/DOWN buttons. Select MODIFIED then press SELECT.
10. Select parameter 30.12 and verify it equals the maximum fan speed.
11. If values are equal, then go to Step 14.
12. If values are not equal, select EDIT, press the UP/DOWN buttons to match the required value.
13. Select SAVE to store the modified value.
14. Select EXIT to return to the listing of parameters.
15. Select Parameter 30.14 and verify it equals the maximum VFD output frequency.
16. If values are equal, then go to Step 19.
17. If values are not equal, select EDIT, press the UP/DOWN buttons to match the required value.
18. Select SAVE to store the modified value.
19. Select EXIT to return to the listing of parameters.
20. Select EXIT to return to the main menu.
21. Press the HAND button and verify that the drive operates at 8 Hz.
22. Press Up arrow to increase speed and Down arrow to decrease speed.
23. Press the Off button and verify that the fan stops.
24. Press the Auto button to operate the drive from the Energy Management System (EMS) interface. Verify that all VFD interface functions are working (start/stop, speed controls, fire/smoke, shutdown, etc.) between the VFD and the EMS.
25. Refer to Tables 2 and 3 for additional VFD information.

VFD WITH BYPASS

When the VFD and bypass are factory-installed, they are wired to the motor and fully tested before shipped. The VFD is programmed at the factory as ordered, including electronic overload, which is programmed for the motor FLA (full load amps) as supplied.

Open the bypass box cover and the fan section access door to check for any damage before proceeding.

ABB E-Clipse Bypass Operator Control

ACH580 CONTROL PANEL WIRING

The ACH580 control panel is a keypad with an LCD unit that provides status indication and operator controls for the ACH580 drive, see Fig. 3. In normal operation with the ABB E-Clipse bypass, the ACH580 should be placed in the Auto model of operation by pressing the Auto key on the ACH580 control panel. Refer to the ACH580 User's Manual for additional information on the ACH580 Control Panel and other aspects of ACH580 operation.

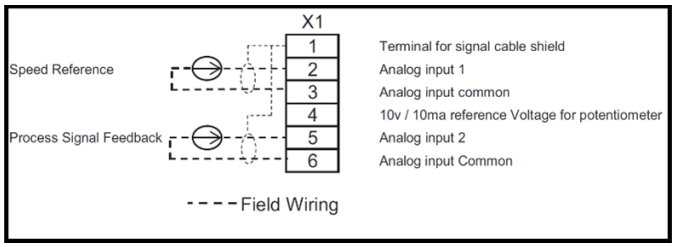


Fig. 3 — ACH580 Control Board Wiring

BYPASS CONTROL KEYPAD AND CONTROL BOARD WIRING

The ABB E-Clipse bypass has a separated keypad with an LCD unit that provides status indication and programming of the system. This keypad is also used for selecting the Drive or Bypass mode. The bypass keypad has LED indicating lights that indicate the status of both the bypass and the drive as well as an LCD display that provides programming, status and warning/fault indications. See Fig. 4 for wiring of the E-Clipse bypass control board.

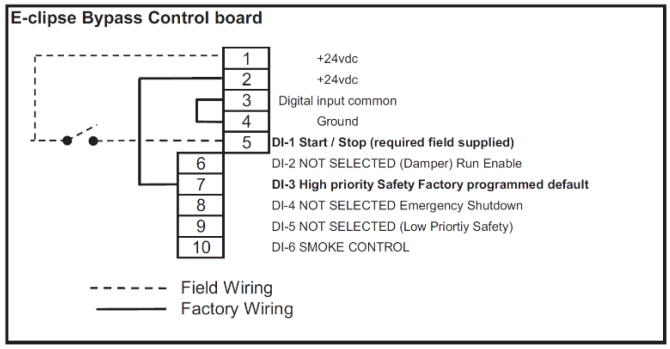


Fig. 4 — E-Clipse Bypass Control Board Wiring

Figure 5 and Table 1 shows the bypass control keypad and identifies the functions of the various keys and LED indicating lights.

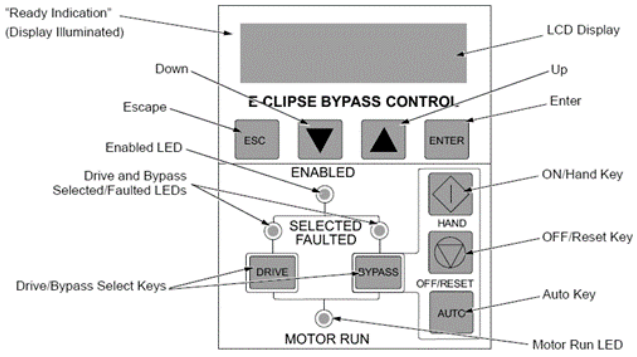


Fig. 5 — Bypass Control Keypad

Table 1 — Bypass Control Keypad Description

KEY/LED UP KEY	DESCRIPTION
On/Hand Key	The On/Hand key can be used to manually start the motor when the bypass has been selected as the power source for the motor.
Off/Reset Key	The Off/Reset key may be used to manually stop the motor if the motor is running on bypass power. The Off/Reset key also resets most bypass Faults. It may take several minutes before the bypass can be reset after an overload trip. If a bypass fault condition is present, the second push of the Off/Reset key puts the bypass in the Off mode.
Auto Key	The Auto key selects the Auto Start contact or serial communications as the means for starting and stopping the motor in the bypass mode.
Motor Run LED	The Motor Run LED is illuminated red when the bypass has lost its communications link with the drive or when the motor or drive protection functions have shut down the drive.
Drive Key	The Drive key selects the drive as the power source for the motor.
Bypass Key	The Bypass key selects the bypass as the power source for the motor.
Drive Selected/ Fault LED	The Drive Selected LED is illuminated green when the drive has been selected as the power source for the motor and no drive fault is present. The Drive Fault LED is illuminated or flashes red when the motor or bypass protective functions have shut down the drive.
Bypass Selected/ Fault LED	The Bypass Selected LED is illuminated green when the bypass has been selected as the power source for the motor and no bypass fault is present. The Bypass Faulted LED is illuminated or flashes red when the motor or bypass protective functions have shut down the bypass.
Enabled LED	The Enabled LED is illuminated green under the following conditions: -Both the safety interlock(s) and Run enable contacts are closed. -The Safety Interlock(s) contact are closed with no Start command present The Enable LED flashes green if the Run Enable contact(s) are closed and a start command is present. The Enable LED is illuminated red when the Safety Interlock contact(s) are open.

SMOKE CONTROL MODE

In the Smoke Control (Override 1) mode, the motor is powered by AC line power through the bypass contactor. The source of the Smoke Control command is DI 6 and is unaffected by external stop commands. The VFD Keypad and the Bypass Keypad will not accept user commands when the system is in Smoke Control mode (the keypad user inputs are disabled). The user can switch to the Smoke Control mode by closing the Smoke Control input contact (DI 6). When the Smoke Control input contact is closed, the system is forced to bypass and runs the motor. The Motor Run LED flashes green when the system is in override. While in Smoke Control, the system only responds to certain inputs. Normally, when the Smoke Control input contact is switched from closed to open, the system returns to the operating mode that existed prior to entering Smoke Control and can once again be controlled using the Drive and Bypass keys. The exception to this is when the Bypass Override (Override 2) input contact is closed, in which case the system switches to Bypass Override operation. See Fig. 6 for typical wiring diagram.

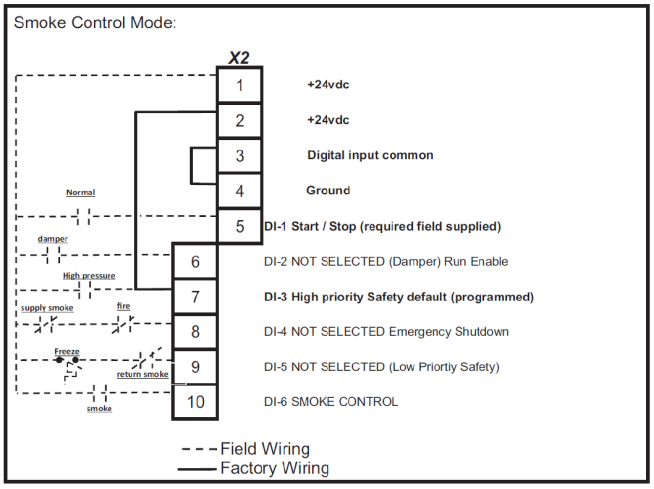


Fig. 6 — Smoke Detector Typical Wiring Diagram

PROGRAMMABLE RELAY CONTACT OUTPUTS

The ABB E-Clipse bypass has 5 programmable relay outputs as standard, see Fig. 4. The default programming descriptions for these relay outputs is described below.

BYPASS NOT FAULTED

The Bypass Not Faulted relay is energized during normal operation. The Bypass Not Faulted relay is de-energized when a bypass fault has occurred.

SYSTEM RUNNING

The System Running relay is energized when the ABB E-Clipse bypass system is running. The System Running relay provides an output when the motor is running whether powered by the ACH580 drive or the bypass.

SYSTEM STARTED

The System Started relay is energized when the ABB E-Clipse bypass system is started. Three conditions must be met in order for the relay to energize:

1. A start command must be present.
2. The Safety Interlock input contact must be closed.
3. There can be no fault present in the system.

BYPASS SELECTED

Relay output four is factory default programmed for Bypass Selected. The relay will be energized anytime the user has placed the system in Bypass Mode.

BYPASS AUTO

Relay Output five is factory default programmed for Bypass Auto. The relay will be energized anytime the user has placed the bypass in the Auto mode.

The complete list of programmable relay output functions follows:

0 — NOT USED
1 — SYS READY
2 — SYS RUNNING
3 — SYS STARTED
4 — BYPASS MODE
5 — BYPASS RUN
6 — BYPASS FLT
7 — BYP NOT FLT
8 — BYPASS WRNG
9 — DRIVE FAULT
10 — DRV NOT FLT
11 — DRIVE WARNING
12 — OVERRIDE
13 — BYPASS HAND
14 — BYPASS OFF
15 — BYPASS AUTO
16 — COMM CTRL
17 — SYS WARNING
18 — BYPASS FLT/WRN
19 — BYP OVERLD
20 — BYP UNDERLD
21 — PCB OVERTEMP
22 — SYS UNDERLD
23 — SYSTEM FLT
24 — SYS FLT/WRN
25 — SYS EXT CTL
26 — SYS OVERLD
27 — CONTACT FLT
28 — SYS NOT FLT
29 — DRV LNK ERR
30 — EXT COMM LS
31 — OVRD2 STOP
32 — OVRD2 ENAB

The Start command can come from the bypass control board terminal block, the ACH580 keypad, the bypass keypad, or serial communications depending on the operational mode selected. The System Started relay is ideal for use in damper actuator circuits, opening the dampers only under those conditions where the system is preparing to run the motor. The System Started relay will de-energize, closing the dampers if the safeties open, the system faults, or when a Stop command is issued.

Table 2 — ACH580 - VFD Data

39M MOTOR HP	ABB PART NO. ACH580-1	MAX. CONTINUOUS OUTPUT AMPS	FUSE AMPS	MCCB RATED AMPS	PROGRAMMED SETTINGS	
					OVERLOAD TRIP AMPS 4 POLE / 2 POLE	MAX. OUTPUT AMPS 4 POLE / 2 POLE
(208-230 VOLT / 3 PHASE / 60 HZ (PROGRAMMED TO OPERATE AT 208 VOLTS)						
1/2	04A6-2	4.6	10	15	1.8/ 1.7	3.0/ 2.2
3/4	04A6-2	4.6	10	15	2.6/ 2.5	3.2/ 3.0
1	04A6-2	4.6	10	15	3.5/ 3.2	3.8/ 3.8
1-1/2	06A6-2	6.6	10	15	5.2/ 4.2	5.8/ 5.8
2	07A5-2	7.5	10	15	6.7/ 5.9	7.2/ 7.0
3	10A6-2	10.6	15	15	9.0/ 8.5	10.0/ 9.5
5	017A-2	16.7	25	25	14.5/ 13.6	16.7/ 16.0
7-1/2	024A-2	24.2	30	30	21.4/ 20.7	24.0/ 23.0
10	031A-2	30.8	40	40	27.4/ 27.4	30.8/ 30.0
15	046A-2	46.2	60	60	40.5/ 40.5	46.2/ 43.0
20	059A-2	59.4	80	80	53.0/ 52.2	59.4/ 57.0
25	075A-2	74.8	100	100	67.0/ 66.0	74.0/ 71.0
30	088A-2	88	110	110	82.0/ 78.0	85.0/ 82.0
40	114A-2	114	150	150	92.0/107.0	114.0/110.0
(208-230 VOLT / 3 PHASE / 60 HZ (PROGRAMMED TO OPERATE AT 230 VOLTS)						
50	143A-2	143	200	200	125.0/130.0	142.0/130.0
60	169A-2	169	250	250	154.0/135.0	172.0/145.0
75	211A-2	211	300	300	186.0/166.0	221.0/172.0
100	273A-2	273	350	350	186.0/166.0	221.0/172.0
(460 VOLT / 3 PHASE / 60 HZ (PROGRAMMED TO OPERATE AT 460 VOLTS)						
1/2	02A1-4	2.1	10	15	0.9/ 1.0	1.5/ 1.2
3/4	02A1-4	2.1	10	15	1.3/ 1.2	1.7/ 1.5
1	02A1-4	2.1	10	15	1.6/ 1.5	1.9/ 1.7
1-1/2	03A0-4	3	10	15	2.2/ 2.0	2.8/ 2.3
2	03A5-4	3.5	10	15	2.7/ 2.7	3.0/ 3.0
3	04A8-4	4.8	10	15	4.0/ 3.8	4.5/ 4.2
5	07A6-4	7.6	10	15	6.2/ 6.0	6.9/ 6.5
7-1/2	012A-4	11.9	15	15	9.0/ 8.8	10.0/ 9.5
10	014A-4	14.4	20	20	12.0/ 11.6	13.6/ 12.8
15	023A-4	23	30	30	17.6/ 16.5	19.3/ 19.0
20	027A-4	27	40	40	23.0/ 23.0	25.0/ 25.0
25	034A-4	34	40	40	29.0/ 28.0	31.0/ 30.0
30	044A-4	44	50	50	34.5/ 34.0	38.0/ 38.0
40	052A-4	52	80	80	46.0/ 44.0	48.0/ 50.0
50	065A-4	65	90	90	58.0/ 55.0	60.0/ 60.0
60	077A-4	77	100	100	73.0/ 68.0	77.0/ 72.0
75	096A-4	96	125	125	90.0/ 85.0	94.0/ 90.0
100	124A-4	124	175	175	118.0/110.0	124.0/114.0
125	156A-4	156	200	200	141.0/139.0	147.0/147.0
150	180A-4	180	250	250	171.0/171.0	177.0/177.0
(200-230 VOLT / 3 PHASE / 50 HZ (PROGRAMMED TO OPERATE AT 200 VOLTS)						
1	04A6-2	4.6	10	15	3.3/ 3.3	3.9/ 3.9
1-1/2	06A6-2	6.6	10	15	4.9/ 4.9	5.8/ 5.8
2	07A5-2	7.5	10	15	6.3/ 6.3	7.1/ 7.1
3	10A6-2	10.6	15	15	8.7/ 8.7	10.0/ 10.0
4	017A-2	16.7	25	25	14.0/ 14.0	16.7/ 16.7
7-1/2	024A-2	24.2	30	30	21.2/ 20.2	24.2/ 24.2
10	031A-2	30.8	40	40	27.2/ 27.4	30.8/ 30.8
15	046A-2	46.2	60	60	41.4/ 40.5	46.2/ 46.2
20	059A-2	59.4	80	80	53.4/ 49.0	59.4/ 56.0
25	075A-2	74.8	100	100	65.4/ 66.0	74.0/ 74.8
30	088A-2	88	110	110	78.0/ 78.0	86.0/ 86.0
40	114A-2	114	150	150	107.0/107.0	114.0/114.0
50	143A-2	143	200	200	135.0/135.0	135.0/135.0
60	169A-2	169	250	250	169.0/169.0	169.0/169.0
75	211A-2	211	300	300	210.0/210.0	210.0/210.0

Table 2 — ACH580 - VFD Data (cont)

39M MOTOR HP	ABB PART NO. ACH580-1	MAX. CONTINUOUS OUTPUT AMPS	FUSE AMPS	MCCB RATED AMPS	PROGRAMMED SETTINGS	
					OVERLOAD TRIP AMPS 4 POLE / 2 POLE	MAX. OUTPUT AMPS 4 POLE / 2 POLE
(380 VOLTS / 3 PHASE / 50 HZ (PROGRAMMED TO OPERATE AT 400 VOLTS)						
1	02A1-4	2.1	10	15	1.7/ 1.7	2.3/ 2.3
1-1/2	03A0-4	3	10	15	2.5/ 2.5	3.3/ 3.3
2	03A5-4	3.5	10	15	3.2/ 3.2	3.8/ 3.6
3	04A8-4	4.8	10	15	4.5/ 4.5	5.4/ 5.3
5	07A6-4	7.6	15	15	7.0/ 7.0	8.5/ 8.0
7-1/2	012A-4	11.9	15	15	10.6/ 8.9	11.9/ 11.0
10	014A-4	14	20	20	13.6/ 11.6	15.4/ 14.6
15	023A-4	23	30	30	20.7/ 17.0	22.6/ 21.0
20	027A-4	27	40	40	26.7/ 24.5	29.3/ 29.0
25	034A-4	34	50	50	32.7/ 29.5	37.0/ 36.0
30	044A-4	44	60	60	39.0/ 39.0	44.0/ 44.0
40	052A-4	52	80	80	53.5/ 45.5	57.0/ 55.0
50	077A-4	77	100	100	67.5/ 67.5	70.0/ 70.0
60	096A-4	96	125	125	84.5/ 84.5	88.0/ 88.0
75	124A-4	124	175	175	105.0/105.0	105.0/105.0
100	156A-4	156	200	200	134.0/134.0	134.0/134.0
125	156A-4	156	200	250	134.0/134.0	134.0/134.0

LEGEND

MCCB — Molded-Case Circuit Breaker

NOTE: Two-pole motors operate at a nominal 3600 rpm for 60 Hz and 3000 rpm for 50 Hz; 4-pole motors operate at a nominal 1800 rpm for 60 Hz and 1500 rpm for 50 Hz.

Table 3 — ACH580 - Air Handler VFD Factory-Set Parameters

GROUP NUMBER	PARAMETER NUMBER	DESCRIPTION	VFD DRIVE ONLY PARAMETERS	VFD WITH E-CLIPSE DESCRIPTION / PARAMETER
10	10.24	Relay Output 1	Started	Started
	10.27	Relay Output 2	Running	Running
	10.30	Relay Output 3	Fault (inverted)	Fault (inverted)
12	12.16	Filter AI-1	1 sec.	1 sec.
	12.17	Minimum AI-1	0	0
	12.18	Maximum AI-1	100%	100%
	12.19	REF 1 Minimum	9.33 Hz at 60 Hz/ 7.78 Hz at 50 Hz	9.33 Hz at 60 Hz/ 7.78 Hz at 50 Hz
	12.20	REF 1 Maximum	Belt Drive 60Hz/50Hz Direct Drive Calculated Per Fan and Motor	Belt Drive 60Hz/50Hz Direct Drive Calculated Per Fan and Motor
	12.25	Unit selection AI-2	V	V
	12.26	Filter AI-2	1 sec.	1 sec.
	12.27	Minimum AI-2	0%	0%
	12.28	Maximum AI-2	100%	100%
	12.29	AI-2 Scaled at AI-2 min	0	0
	12.30	AI-2 Scaled at AI-2 max	100	100
19	19.11	EXT1/EXT2 selection	EXT2	EXT2
20	20.01	EXT 1 Commands	IN1 Start	BYP 1601 - DI-1
	20.06	EXT 2 Commands	(0)Not selected	BYP 1601 - DI-1
	20.08	Ext 2 in1 source	DI-1	DI-1
	20.21	Direction	Forward	Forward
	20.40	Run Enable	DI-2	BYP 1602 - DI-2
	20.41	Start Enable 1 (safety 1)	DI-3	BYP 1603 - DI-3
	20.42	Start Enable 2 (safety 2)	DI-4	BYP 1604 - DI-4
21	21.03	Stop Function	Coast	Coast
	21.19	Start Function	Flying Start	Flying Start
	21.19	Scalar Start Mode	Scaler Flystart	Scaler Flystart
22	23.12	Acceleration time1	10 s	10 s
23	23.13	Deceleration time1	10 s	10 s
	40.07	Process PID operation mode	on when drive running	N/A

Table 3 — ACH580 - Air Handler VFD Factory-Set Parameters (cont)

GROUP NUMBER	PARAMETER NUMBER	DESCRIPTION	VFD DRIVE ONLY PARAMETERS	VFD WITH E-CLIPSE DESCRIPTION / PARAMETER
28	28.22	Constant Speed Select	DI-3	DI-3
	28.26	Constant Speed Value	Field Program	Field Program
			(8Hz - Motor Nominal Freq.)	(8Hz - Motor Nominal Freq.)
	28.72	Acceleration Time	60 Seconds	60 Seconds
	28.73	Deceleration Time	60 Seconds	60 Seconds
30	30.12	Maximum Fan Speed	Per Fan	Per Fan
	30.17	Maximum Current	**	**
	30.13	Minimum Frequency	8Hz	8Hz
	30.14	Maximum Frequency	Belt Drive 60Hz/50Hz Direct	Belt Drive 60Hz/50Hz Direct
			Drive Calculated Per Fan and	Drive Calculated Per Fan and
			Motor	Motor
31	31.20	Earth Fault	Fault	Fault
	31.24	Stall Function	Fault	Fault
	31.27	Stall Frequency	20 Hz	20 Hz
	31.28	Stall Time	20 Sec.	20 Sec.
35	35.55	Motor Thermal Time	1050	1050
	35.51	Motor Load Curve	105%	105%
	35.52	Zero Speed Load	70%	70%
	35.53	Break Point Frequency	35 Hz	35 Hz
40	40.09	Set 1 feedback 2 source	AI-2 scaled	AI-2 scaled
	40.10	Feedback Select	AI-2	AI-2
	40.17	Set 1 setpoint 2 source	Not Selected	Not Selected
	40.18	Set 1 function	In1	In1
	40.21	INTERNAL SET POINT 1	Select your set point	Select your set point
			from 0 to 100 scale	from 0 to 100 scale
	40.27	Set1 setpoint max	100	100
	40.31	ERROR VALUE INVERTED	YES	YES
	40.32	PID GAIN	0.7	0.7
	40.33	PID INTEGRATE	30s	30s
	40.34	DERIVATION TIME	0	0
	40.60	Set PID 1 Activation source	DI-1	DI-1
	40.79	UNITS	Volts	Volts
58	58.01	Comm Prot SEL	NONE	Modbus RTU
97	97.01	Switching Frequency	8 Hz	8 Hz
	97.02	Switching Frequency Control	ON	ON
	97.20	Volt/Freq Ratio	Linear	Linear
99	99.04	Motor Control Mode	Scalar	Scalar
	99.07	Motor Normal Voltage	*	*
	99.06	Motor Normal Current	†	†
	99.08	Motor Normal Frequency	60 Hz or 50 Hz	60 Hz or 50 Hz
	99.09	Motor Normal Speed	Name plate rpm at load	Name plate rpm at load
	99.10	Motor Normal Power	Nameplate Hp	Nameplate Hp

* Factory Programmed as follows: For 208-230v / 60 Hz = 208, 460v / 60 Hz = 460, 200-230v / 50 Hz = 200, 380 / 50 Hz = 400.

† Motor Nameplate Amps. Factory programmed per Programmed Settings in Table 2. This value should always be compared to the actual motor nameplate value before start-up.

** Maximum Output Amps — Factory programmed per Table 2.

ACH580 VFD Operation

The VFD keypad is shown in Fig 7 and Fig. 8. The functions of SOFT KEYS (and), change depending on what is displayed on the screen. The function of SOFT KEY 1 matches the word in the lower left-hand box on the display screen. The function of SOFT KEY 2 matches the word in the lower right-hand box on the display screen. If the box is empty, then the SOFT KEY does not have a function on that specific screen. Arrow Keys are used to navigate through the menus. The OFF key is used to turn off the VFD. The AUTO key is used to change control of the drive to automatic control. The HAND key is used to change control of the drive to local (hand held) control. The HELP button is used to access the help screens.

For the VFD to operate on the units covered by this document, the drive must be set in AUTO mode. The word AUTO will appear in the upper left-hand corner of the VFD display. Press the AUTO button to set the drive in AUTO mode.

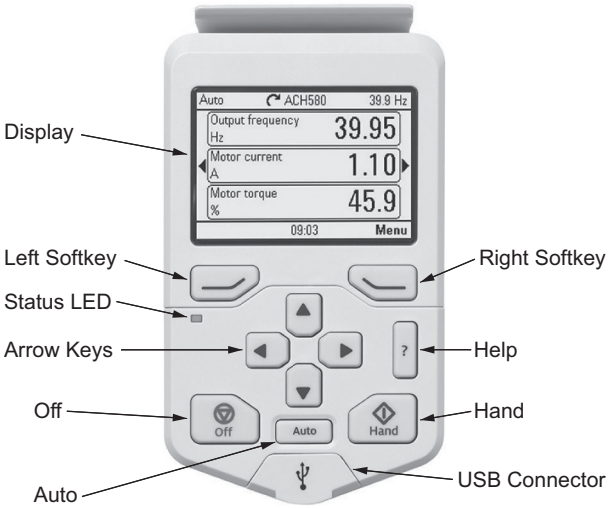


Fig. 7 — ACH580 VFD Keypad (Front)

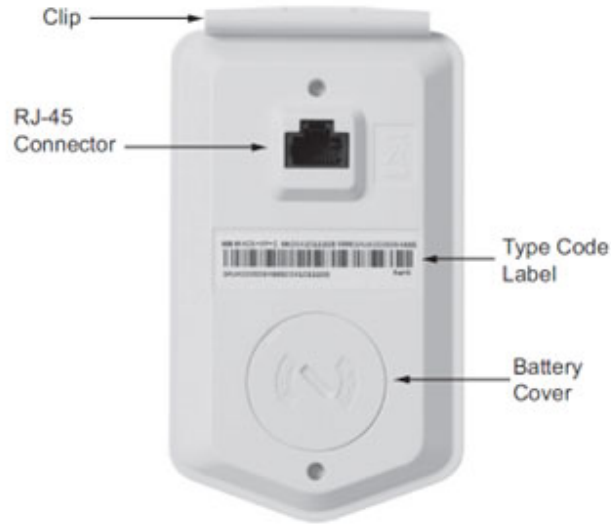


Fig. 8 — ACH580 VFD Keypad (Back)

START UP CHANGING PARAMETERS INDIVIDUALLY

Initial start-up is performed at the factory. To start up the VFD by changing individual parameters, perform the following procedure:

1. Select MENU (Press) The Main menu will be displayed.
2. Use the UP or DOWN keys to highlight PARAMETERS on the display screen and press SEL (Press).
3. Use the UP or DOWN keys to highlight the desired parameter group and press SEL (Press).
4. Use the UP or DOWN keys to highlight the desired parameter and press EDIT (Press).
5. Use the UP or DOWN keys to change the value of the parameter.
6. Press SAVE (Press) to store the modified value. Press CANCEL (Press) to keep the previous value. Any modifications that are not saved will not be changed.
7. Choose another parameter or press EXIT/BACK (Press) to return to the listing of parameter groups. Continue until all the parameters have been configured and then press EXIT/BACK (Press) to return to the main menu.

NOTE: The current parameter value appears above the highlight parameter. To view the default parameter value, press the UP and DOWN keys simultaneously.

VFD Modes

The VFD has several different modes for configuring, operating, and diagnosing the VFD.

The modes are:

- Standard Display mode - shows drive status information and operates the drive
- Parameters mode - edits parameter values individually
- Start-up Assistant mode - guides start-up and configuration
- Changed Parameters mode - shows all changed parameters
- Drive Parameter Backup mode - stores or uploads the parameters
- Clock Set mode - sets the time and date for the drive
- I/O Settings mode - checks and edits the I/O settings

ACH580 Standard Display Mode

Use the standard display mode to read information on the drive status and operate the drive. To reach the standard display mode, press BACK until the LCD display shows status information as described below. (See Fig. 7.)

The top line of the LCD display shows the basic status information of the drive. The HAND icon indicates that the drive control is local from the control panel. The AUTO icon indicates that the drive is in remote control mode, such as the basic I/O or field bus.

The arrow icon indicates the drive and motor rotation status. A rotating arrow (clockwise or counterclockwise) indicates that the drive is running and at set point and the shaft direction is forward or reverse. A rotating blinking arrow indicates that the drive is running but not at set point. A stationary arrow indicates that the drive is stopped. For the units covered in this manual, the correct display rotation is clockwise.

The upper right corner shows the frequency set point that the drive will maintain. From Home view press Options then Edit Home View to change the Home layout, the middle of the LCD display can be configured to display 3 parameter values, Graphs or digital indicators. The default display shows (OUTPUT FREQ) in percent speed, (CURRENT) in amperes, and (AI1) in voltage DC.

The bottom corners of the LCD display show the functions currently assigned to the two soft keys. The lower middle displays the current time (if configured to show the time).

The first time the drive is powered up, it is in the OFF mode. To switch to local hand-held control and control the drive using the control panel, press and hold the HAND button. Pressing the HAND button switches the drive to hand control while keeping the drive running. Press the AUTO button to switch to remote

input control. To start the drive press the HAND or AUTO buttons, to stop the drive press the OFF button.

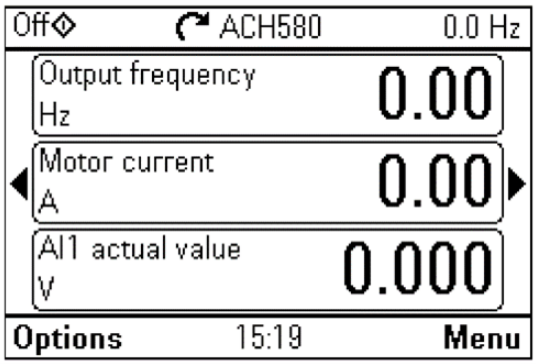


Fig. 9 — Standard Display Example

The top line of the LCD display shows the basic status information of the drive. The HAND icon indicates that the drive control is local from the control panel. The AUTO icon indicates that the drive is in remote control mode, such as the basic I/O or field bus.

The arrow icon indicates the drive and motor rotation status. A rotating arrow (clockwise or counterclockwise) indicates that the drive is running and at set point and the shaft direction is forward or reverse. A rotating blinking arrow indicates that the drive is running but not at set point. A stationary arrow indicates that the drive is stopped. For the units covered in this manual, the correct display rotation is clockwise.

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The bottom corners of the LCD display show the functions currently assigned to the two soft keys. The lower middle displays the current time (if configured to show the time).

The first time the drive is powered up, it is in the OFF mode. To switch to local hand-held control and control the drive using the control panel, press and hold the HAND button. Pressing the HAND button switches the drive to hand control while keeping the drive running. Press the AUTO button to switch to remote input control. To start the drive press the HAND or AUTO buttons, to stop the drive press the OFF button.

To adjust the speed in HAND mode, press the UP or DOWN buttons (the reference changes immediately). The reference can be modified in the local control (HAND) mode, and can be parameterized (using Group 11 reference select) to also allow modification in the remote control mode.

Parameters Mode

The Parameters mode is used to change the parameters on the drive. To change parameters, perform the following procedure:

1. Select MENU (Press). The Main menu will be displayed.
2. Use the UP or DOWN keys to highlight PARAMETERS on the display screen and press Select (Press).
3. Use the UP or DOWN keys to highlight the desired parameter group and press Select (Press).
4. Use the UP or DOWN keys to highlight the desired parameter and press EDIT (Press).
5. Use the UP or DOWN keys to change the value of the parameter.
6. Press SAVE (Press).to store the modified value. Press CANCEL (Press) to keep the previous value. Any modifications that are not saved will not be changed.
7. Choose another parameter or press BACK (Press) to return to the listing of parameter groups. Continue until all the parameters have been configured and then press EXIT (Press) to return to the main menu.

Changed Parameters Mode

The Changed Parameters mode is used to view and edit recently changed parameters on the drive. To view the changed parameters, perform the following procedure:

1. Select MENU (Press).The Main menu will be displayed.
2. Use the UP or DOWN keys to highlight PARAMETERS on the display screen and press Select (Press).
3. Use the UP or DOWN keys to highlight MODIFIED on the display screen and press Select (Press). A list of the recently changed parameters will be displayed.
4. Use the UP or DOWN keys to highlight the desired parameter group and press EDIT (Press) to change the parameter if desired.
5. Press BACK (Press) to exit the Changed Parameters mode.

Drive Parameter Backup Mode

The drive parameter back up mode is used to export the parameters from one drive to another. The parameters can be uploaded from a VFD to the removable control panel. The control panel can then be transferred to another drive and the parameters downloaded into memory.

Depending on the motor and application, there are two options available. The first option is to download all parameters. This copies both application and motor parameters to the drive from the control panel. This is recommended when using the same application for drives of the same size. This can also be used to create a backup of the parameters group for the drive.

The second option downloads only the application parameters to the drive. This is recommended when using the same application for drives of different sizes. Parameters 99.07, 99.06, 99.08, 99.09, 99.10, and group 51 parameters and internal motor parameters are not copied.

Upload All Parameters

To upload and store parameters in the control panel from the VFD, only is required to insert the Keypad in the VFD slot (Fig. 10) and animation will appear loading the VFD configuration.

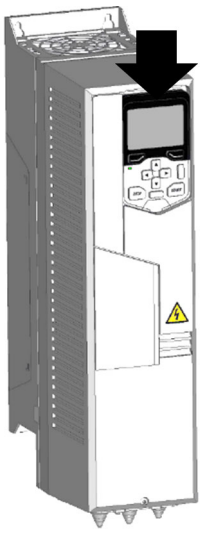

Fig. 10 — Insert keypad in Slot

DOWNLOAD ALL PARAMETERS FROM BACKUP

To download all parameters from the control panel to the VFD, perform the following procedure:

1. Install the control panel with the correct parameters onto the VFD.
2. Select MENU (Press). The Main menu will be displayed.
3. Use the UP or DOWN keys to highlight BACKUPS on the display screen and press SEL (Press).
4. Use the UP or DOWN keys to highlight the backup file and press SEL (Press).
5. The text Restoring Parameters will be displayed with a progress indicator. To stop the process, select CANCEL (Press).
6. When the download is complete, the text Parameter download successful will be displayed.
7. The display will then return to the PAR BACKUP menu. Select BACK (Press) to return to the main menu.
8. The control panel can now be disconnected from the drive.

Clock Set Mode

Use the clock set mode to set the date and time for the internal clock of the VFD. In order to use the timer functions of the VFD control, the internal clock must be set. The date is used to determine weekdays and is visible in the fault logs.

To set the clock, perform the following procedure:

1. Select MENU (Press). The Main menu will be displayed.
2. Use the UP or DOWN keys to highlight PRIMARY SETT. on the display screen and press ENTER (Press). The Sub list will be displayed.
3. Use the UP or DOWN keys to highlight Clock, region, display and press SEL (Press). This parameter is used to display or hide the clock on the screen. Use the UP or DOWN keys to change the parameter setting. Press OK (Press) to save the configuration and return to the Sub list menu.
4. Use the UP or DOWN keys to highlight SET TIME and press SEL (Press). Use the UP or DOWN keys to change the hours and minutes. Press OK (Press) to save the configuration and return to the Clock Set menu.
5. Use the UP or DOWN keys to highlight TIME FORMAT and press SEL (Press). Use the UP or DOWN keys to change the parameter setting. Press OK (Press) to save the configuration and return to the Clock Set menu.
6. Use the UP or DOWN keys to highlight SET DATE and press SEL (Press). Use the UP or DOWN keys to change the day, month, and year. Press OK (Press) to save the configuration and return to the Clock Set menu.
7. Use the UP or DOWN keys to highlight DATE FORMAT and press SEL (Press). Use the UP or DOWN keys to change the parameter setting. Press OK (Press) to save the configuration and return to the Clock Set menu.
8. Press BACK (Press) twice to return to the main menu.

I/O Settings Mode

Use the I/O Settings mode to view and edit the I/O settings.

To configure the I/O settings, perform the following procedure:

1. Select MENU (Press). The Main menu will be displayed.
2. Use the UP or DOWN keys to highlight PRIMARY SETT. on the display screen and press SEL (Press). The Sub list will be displayed.
3. Use the UP or DOWN keys to highlight ADVANCED OPTIONS/FUNCTIONS. on the display screen and press SEL (Press). The Sub list will be displayed.
4. Use the UP or DOWN keys to highlight I/O SETTINGS on the display screen and press SEL (Press). The I/O Settings parameter list will be displayed.
5. Use the UP or DOWN keys to highlight the desired I/O setting and press SEL (Press).
6. Use the UP or DOWN keys to select the parameter to view. Press OK (Press).
7. Use the UP or DOWN keys to change the parameter setting. Press SAVE (Press). to save the configuration. Press CANCEL (SOFT KEY 1) to keep the previous value. Any modifications that are not saved will not be changed.
8. Press BACK (Press) twice to return to the main menu.

VFD DIAGNOSTICS

The drive detects error situations and reports them using:

1. Status LED on the control panel
2. Control panel display
3. The Fault Word and Alarm Word parameter bits

The form of the display depends on the severity of the error. The user can specify the severity for many errors by directing the drive to ignore the error situation, report the situation as an alarm, or report the situation as a fault.

Faults (Red LED Lit)

The VFD signals that it has detected a severe error, or fault, by:

1. Enabling the red LED on the drive (LED is either steady or flashing).
2. Setting an appropriate bit in a Fault Word parameter.
3. Overriding the control panel display with the display of a fault code.
4. Stopping the motor (if it was on).

The fault code on the control panel display is temporary. Pressing the MENU, (Press). buttons removes the fault message. The message reappears after a few seconds if the control panel is not touched, and the fault is still active. See Table 4 for a list of fault codes.

Alarms (Green LED Flashing)

For less severe errors, called alarms, the diagnostic display is advisory. For these situations, the drive is simply reporting that it had detected something unusual. In these situations, the drive:

1. Flashes the green LED on the drive (does not apply to alarms that arise from control panel operation errors).
2. Sets an appropriate bit in an Alarm Word parameter.
3. Overrides the control panel display with the display of an alarm code and/or name.

Alarm messages disappear from the control panel display after a few seconds. The message returns periodically as long as the alarm condition exists. See Table 4 for a list of alarm codes.

Correcting Faults

The recommended corrective action for faults is shown in the Fault Listing Table 4. The VFD can also be reset to remove the fault. If an external source for a start command is selected and is active, the VFD may start immediately after fault reset.

To reset a fault indicated by a flashing red LED, turn off the power for 5 minutes. To reset a fault indicated by a red LED (not flashing), press RESET from the control panel or turn off the power for 5 minutes. Depending on the value of parameter, digital input or serial communication could also be used to reset the drive. When the fault has been corrected, the motor can be started.

Correcting Alarms

To correct alarms, first determine if the alarm requires any corrective action (action is not always required). Use Table 4 to find and address the root cause of the problem.

If diagnostics troubleshooting has determined that the drive is defective during the warranty period, contact Carrier.

Control Panel Cleaning

Use a soft damp cloth to clean the control panel. Avoid harsh cleaners which could scratch the display window.

Battery Replacement

A battery is only used in assistant control panels that have the clock function available and enabled. The battery keeps the clock operating in memory during power interruptions. The expected life for the battery is greater than ten years. To remove the battery, use a coin to rotate the battery holder on the back of the control panel. Replace the battery with type CR2032.

Table 4 — Fault and Alarm Codes for ACH580 VFD

CODE (HEX)	WARNING / AUX. CODE	CAUSE	WHAT TO DO
A2B1	Overcurrent	Output current has exceeded internal fault limit. In addition to an actual overcurrent situation, this warning may also be caused by an earth fault or supply phase loss.	Check motor load.
			Check acceleration times in parameter group *23 Speed reference ramp* (speed control) or *28 Frequency reference chain* (frequency control). Also check parameters *46.01 Speed scaling*, *46.02 Frequency scaling* and *46.03 Torque scaling*.
			Check motor and motor cable (including phasing and delta/star connection). Check for an earth fault in motor or motor cables by measuring the insulation resistances of motor and motor cable. See chapter *Electrical installation*, section *Checking the insulation of the assembly* in the *Hardware manual* of the drive.
			Check there are no contactors opening and closing in motor cable.
			Check that the start-up data in parameter group *99 Motor data* corresponds to the motor rating plate.
			Check that there are no power factor correction capacitors or surge absorbers in motor cable.
A2B3	Earth leakage	Drive has detected load unbalance typically due to earth fault in motor or motor cable.	Check there are no power factor correction capacitors or surge absorbers in motor cable.
			Check for an earth fault in motor or motor cables by measuring the insulation resistances of motor and motor cable. See chapter *Electrical installation*, section *Checking the insulation of the assembly* in the *Hardware manual* of the drive. If an earth fault is found, fix or change the motor cable and/or motor. If no earth fault can be detected, contact your local ABB representative.
A2B4	Short circuit	Short-circuit in motor cable(s) or motor.	Check motor and motor cable for cabling errors.
			Check motor and motor cable (including phasing and delta/star connection). Check for an earth fault in motor or motor cables by measuring the insulation resistances of motor and motor cable. See chapter *Electrical installation*, section *Checking the insulation of the assembly* in the *Hardware manual* of the drive.
			Check there are no power factor correction capacitors or surge absorbers in motor cable.
A6A4	Motor nominal value	The motor parameters are set incorrectly.	Check the auxiliary code. See actions for each code below.
	Motor nominal value 0001	The drive is not dimensioned correctly.	Check the auxiliary code. See actions for each code below.
			Check the settings of the motor configuration parameters in groups 98 and 99.
			Check that the drive is sized correctly for the motor.
A780	Motor stall Programmable warning: *31.24 Stall function*	Motor is operating in stall region because of, for example, excessive load or insufficient motor power.	Check motor load and drive ratings. Check fault function parameters.
A783	Motor overload	Motor current is too high.	Check for overloaded motor.
			Adjust the parameters used for the motor overload function (*35.51...35.53*) and *35.55...35.56*.

Table 4 — Fault and Alarm Codes for ACH580 VFD (cont)

CODE (HEX)	WARNING / AUX. CODE	CAUSE	WHAT TO DO
A784	Motor disconnect	All three output phases are disconnected from motor.	Check that switches between drive and motor are closed. Check that all cables between drive and motor are connected and secured. If no issue was detected and drive output was actually connected to motor, contact ABB.
A7AB	Extension I/O configuration failure	Installed extension module is not the same as configured.	Check that the installed extension module (shown by parameter *15.02 Detected extension module*) is the same as selected by parameter *15.01 Extension module type*.
A7C1	FBA A communication Programmable warning: *50.02 FBA A comm loss func*	Cyclical communication between drive and fieldbus adapter module A or between PLC and fieldbus adapter module A is lost.	Check status of fieldbus communication. See user documentation of fieldbus interface. Check settings of parameter groups *50 Fieldbus adapter (FBA)*, *51 FBA A settings*, *52 FBA A data in* and *53 FBA A data out*. Check cable connections. Check if communication master is able to communicate.
A7CE	EFB comm loss Programmable warning: *58.14 Communication loss action*	Communication break in embedded fieldbus (EFB) communication.	Check the status of the fieldbus master (online/offline/error etc.). Check cable connections to the EIA-485/X5 terminals 29, 30 and 31 on the control unit.
A7EE	Panel loss Programmable warning: *49.05 Communication loss action*	Control panel or PC tool selected as active control location for drive has ceased communicating.	Check PC tool or control panel connection. Check control panel connector. Check mounting platform if being used. Disconnect and reconnect the control panel.
A88F	Cooling fan	Maintenance timer limit exceeded.	Consider changing the cooling fan. Parameter *05.04 Fan on-time counter* shows the running time of the cooling fan.
AFAA	Auto reset	A fault is about to be auto reset.	Informative warning. See the settings in parameter group *31 Fault functions*.
AFE1	Emergency stop (off2)	Drive has received an emergency stop (mode selection off2) command.	Check that it is safe to continue operation. Then return emergency stop push button to normal position. Restart drive. If the emergency stop was unintentional, check the source selected by parameter *21.05 Emergency stop source*.
AFE2	Emergency stop (off 1 or off3)	Drive has received an emergency stop (mode selection off1 or off3) command.	Check that it is safe to continue operation. Then return emergency stop push button to normal position. Restart drive. If the emergency stop was unintentional, check the source selected by parameter *21.05 Emergency stop source*. Informative warning. See parameter *21.22 Start delay*.
AFE9	Start delay	The start delay is active and the drive will start the motor after a predefined delay.	Check that it is safe to continue operation. Then return emergency stop push button to normal position. Restart drive. If the emergency stop was unintentional, check the source selected by parameter *21.05 Emergency stop source*. Informative warning. See parameter *21.22 Start delay*.
AFED	Run permissive	Run permissive is keeping the drive from running the motor.	Check the setting of (and source selected by) parameter *20.40 Run permissive*.
AFEE	Start interlock 1	Start interlock 1 is keeping the drive from starting.	Check the signal source selected for parameter *20.41 Start interlock 1*.
AFEF	Start interlock 2	Start interlock 2 is keeping the drive from starting.	Check the signal source selected for parameter *20.42 Start interlock 2*.
AFF0	Start interlock 3	Start interlock 3 is keeping the drive from starting.	Check the signal source selected for parameter *20.43 Start interlock 3*.
AFF1	Start interlock 4	Start interlock 4 is keeping the drive from starting.	Check the signal source selected for parameter *20.44 Start interlock 4*.
AFF2	Run permissive forced warning	A forced DI is used as a source for parameter *20.40 Run permissive*.	If *20.40 Run permissive* uses DIx as the source, check if the bit corresponding to DIx in parameter *10.03 DI force selection* is 1.
AFF3	Start interlock forced warning	One or more forced DIs is used as a source for one or more of parameters *20.41 Start interlock 1. 20.44 Start interlock 4*.	Check all parameters *20.41 Start interlock 1 ... 20.44 Start interlock 4*. If any of these parameters uses DIx as the source, check if the bit corresponding to DIx in parameter *10.03 DI force selection* is 1.
AFF5	Override new start required	The Safe torque off function was active and has been reset while in Override.	A new start signal is required to start the drive again.
AFF6	Identification run	Motor ID run will occur at next start.	Informative warning.
AFF8	Motor heating active	Pre-heating is being performed	Informative warning. Motor pre-heating is active. Current specified by parameter *21.16 Preheating current* is being passed through the motor.
AFFE	Override active	Drive is in Override mode.	Informative warning.
B5A2	Power applied	The drive was powered up or the control board was rebooted successfully.	Informative event.
B681	Hand mode selected	The drive was placed in Hand mode.	Informative event. Check the control panel to ensure that the current control location is correct.

Table 4 — Fault and Alarm Codes for ACH580 VFD (cont)

CODE (HEX)	WARNING / AUX. CODE	CAUSE	WHAT TO DO
B682	Off mode selected	The drive was placed in Off mode.	Informative event. Check the control panel to ensure that the current control location is correct.
B683	Auto mode selected	The drive was placed in Auto mode.	Informative event. Check the control panel to ensure that the current control location is correct.
2310	Overcurrent	Output current has exceeded internal fault limit.	Check motor load.
		In addition to an actual overcurrent situation, this fault may also be caused by an earth fault or supply phase loss.	Check acceleration times in parameter group *23 Speed reference ramp* (speed control) or *28 Frequency reference chain* (frequency control). Also check parameters *46.01 Speed scaling*, *46.02 Frequency scaling* and *46.03 Torque scaling*.
			Check motor and motor cable (including phasing and delta/star connection). Check there are no contactors opening and closing in motor cable.
			Check that the start-up data in parameter group 99 corresponds to the motor rating plate.
			Check that there are no power factor correction capacitors or surge absorbers in motor cable.
			Check for an earth fault in motor or motor cables by measuring the insulation resistances of motor and motor cable. See chapter *Electrical installation*, section *Checking the insulation of the assembly* in the *Hardware manual* of the drive.
FF61	ID run	Motor ID run was not completed successfully.	Check safety circuit connections. For more information, see chapter *The Safe torque off function* in the *Hardware manual* of the drive and description of parameter *31.22 STO indication run/stop*(page *520*).
			Check the value of parameter *95.04 Control board supply*.
			Check the nominal motor values in parameter group *99 Motor data*. Check that no external control system is connected to the drive.
			Cycle the power to the drive (and its control unit, if powered separately). Check that no operation limits prevent the completion of the ID run. Restore parameters to default settings and try again.
			Check that the motor shaft is not locked. Check the auxiliary code. See actions for each code.

ACH580 MAINTENANCE SCHEDULE

Valid for drives manufactured or maintained in 2017 onwards.

Recommended maintenance intervals and component replacements are based on specified operational and environmental conditions. Annual drive inspections are recommended to ensure the highest reliability and optimum performance.

NOTE: Long term operation near the maximum specified ratings or environmental conditions may require shorter maintenance intervals for certain components.

LEGEND

I — **Inspection** (inspection and maintenance action if needed)

P — **Performance** of on/off-site work (commissioning, tests, measurements, or other work)

R — **Replacement**

Table 5 — Maintenance - Annual actions

RECOMMENDED ANNUAL ACTIONS BY THE USER	
Cabinet door filters IP54	R
Quality of supply voltage	P
Spare parts	
Spare parts	I
DC circuit capacitors reforming for spare modules and spare capacitors	P
Inspections by user	
IP22 and IP42 air inlet and outlet meshes	I
Tightness of terminals	I
Dustiness, corrosion and temperature	I
Heat sink cleaning	I

Table 6 — Maintenance Cooling

COOLING	YEARS FROM START-UP						
	3	6	9	12	15	18	21
Fans, IP21 UL (NEMA) Type 1 frames R1 to R9							
Main cooling fans R0-R5		R		R		R	
Main cooling fans R6-R8 LONGLIFE			R			R	
Auxiliary cooling fan for circuit boards, R4v2 89A/IP21 & R4v2 77A/IP21		R		R		R	
Auxiliary cooling fan for circuit boards, only R5 – R8 LONGLIFE			R			R	
Fans, IP55 UL (NEMA) Type 12 frames R1 to R8 (Not standard offering)							
Main cooling fans R1-R5		R		R		R	
Main cooling fans R6-R8 LONGLIFE			R			R	
Auxiliary cooling fan for circuit boards R1-R2	R	R	R	R	R	R	R
Auxiliary cooling fan for circuit boards R3, R4 LONGLIFE			R			R	
Auxiliary cooling fan for circuit boards R4v2		R		R		R	
Auxiliary cooling fan for circuit boards R5-R8 LONGLIFE			R			R	
Second Auxiliary cooling fan, only R8 LONGLIFE			R			R	

Table 7 — Maintenance Aging

AGING	YEARS FROM START-UP						
	3	6	9	12	15	18	21
Common, control panel battery							
Control panel battery			R			R	
Cabinet auxiliary 24VDC power supplies and buffers >-<				R			
Frequency converter frames R1 to R8							
CCU control unit				R			
Frequency converter frames R6 to R8							
Flat ribbon cables				R			
DC circuit electrolytic capacitors and discharging resistors			R			R	
ZINT, ZPOW, ZINP, QINT module internal circuit boards				R			

Main Fan Replacement IP21 and IP55 (UL Type 1 and UL Type 12)

The main cooling fan of the VFD has a life span of about 60,000 operating hours at maximum rated operating temperature and drive load. The expected life span doubles for each 18°F drop in the fan temperature (fan temperature is a function of ambient temperatures and drive loads).

Fan failure can be predicted by the increasing noise from fan bearings and the gradual rise in the heat sink temperature in spite of heat sink cleaning. If the drive is operated in a critical part of a process, fan replacement is recommended once these symptoms start appearing. Replacement fans are available from Carrier.

To replace the main fan for frame sizes R1 through R8, perform the following (see Fig. 11-15):

1. Remove power from drive. Wait for 5 minutes and then make sure by measuring that there is no voltage.
2. Remove drive cover.
3. For frame sizes R1, R2, R3 and R4 press together the retaining clips on the fan cover and lift. For frame sizes R5, R6, R7 and R8, remove the two mounting screws of the fan mounting plate at the bottom of the drive.
4. Disconnect the fan cable.
5. Install the new fan by reversing Steps 2 to 4.
6. Restore power.

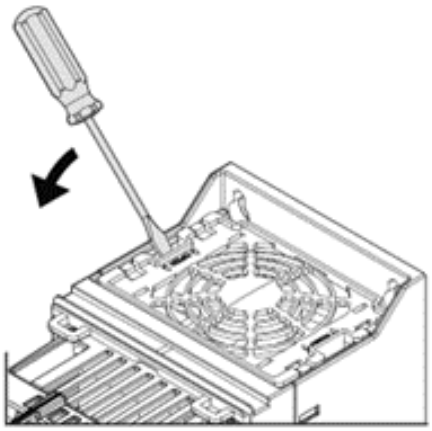

Fig. 11 — Main Fan Remove (Frame Sizes R1 up to R4)

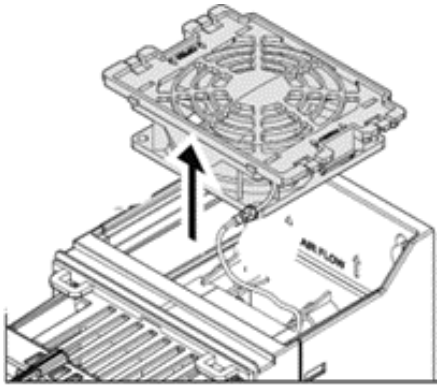

Fig. 12 — Main Fan Remove (Frame Sizes R1 up to R3)

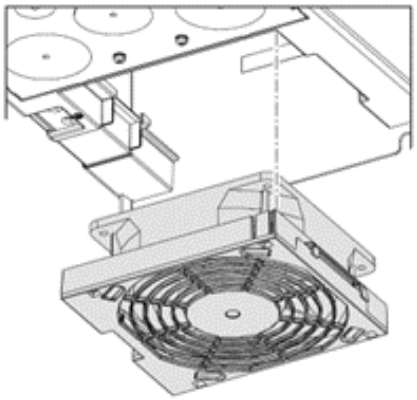

Fig. 13 — Main Fan Remove (Frame Sizes R4)

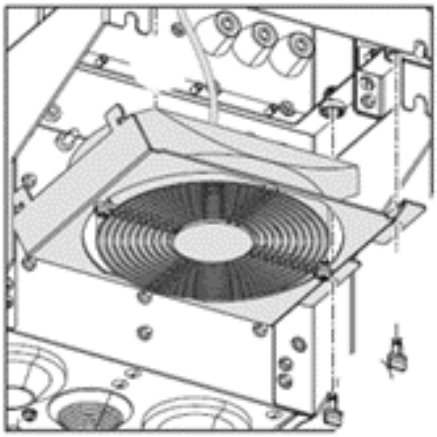

Fig. 14 — Main Fan Remove (Frame Sizes R5 up to R8)

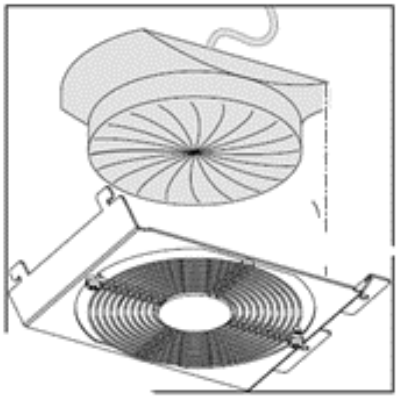

Fig. 15 — Main Fan Remove (Frame Sizes R5 up to R8)

Auxiliary Cooling Fan Replacement IP21 and IP55 (UL Type 1 and UL Type 12)

The VFD IP21 and IP55 / UL Type 1 and 12 enclosures have an additional internal fan to circulate air inside the enclosure.

To replace the internal enclosure fan for frame sizes R6 to R8, perform the following (see Fig. 16 and 17):

1. Remove power from drive. Wait for 5 minutes and then make sure by measuring that there is no voltage.
2. Remove the front cover.
3. Unplug fan power supply wires from the drive.
4. Release the retaining clips.
5. Pull off the fan.
6. Install the new fan in reverse order.

NOTE: Make sure that the arrow on the fan points up.

To replace the internal enclosure fan for frame sizes IP55 (UL Type 12) R1, R2 and R3, perform the following (see Fig. 18-22):

1. Remove power from drive. (R1, R2 and R3).
2. Remove the front cover. (R1, R2 and R3).
3. Unplug fan power supply wires from the drive. (R1, R2 and R3).
4. Remove the fingerguard. Insert a screwdriver into the hole of the fingerguard. (R1, R2 Only).
5. Unplug the fan power supply wires from the drive. (R1, R2 and R3).
6. Pull off the plastic housing. (R3 Only).
7. Pull off the fan. (R1, R2 and R3).
8. Install the new fan in reverse order. (R1, R2 and R3).

Note: Make sure that the arrow on the fan points to the same direction as the arrow on the drive frame.

To replace the internal enclosure fan for frame sizes IP55 (UL Type 12) frame R4; IP21 and IP55 (UL Type 1 and UL Type 12) frame R5 perform the following (see Fig. 18, 19 and 22):

1. Remove power from drive.
2. Remove the front cover.
3. Unplug fan power supply wires from the drive.
4. Remove the fingerguard: Insert a screwdriver into the hole of the fingerguard.
5. Unplug the fan power supply wires from the drive.
6. Pull off the plastic housing.
7. Pull off the fan.
8. Install the new fan in reverse order.

NOTE: Make sure that the arrow on the fan points to the same direction as the arrow on the drive frame.

CONTROL PANEL CLEANING

Use a soft damp cloth to clean the control panel. Avoid harsh cleaners which could scratch the display window.

BATTERY REPLACEMENT

A battery is only used in assistant control panels that have the clock function available and enabled. The battery keeps the clock operating in memory during power interruptions. The expected life for the battery is greater than ten years. To remove the battery, use a coin to rotate the battery holder on the back of the control panel. Replace the battery with CR2032.

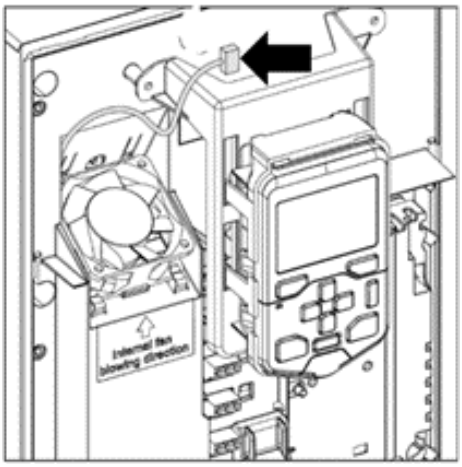

Fig. 16 — Auxiliary Fan Remove (Frame Sizes R6 up to R8)

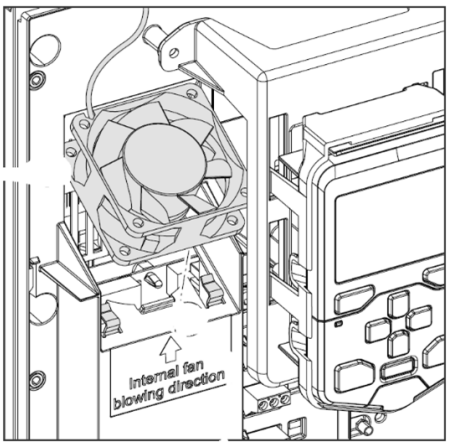

Fig. 17 — Auxiliary Fan Remove (Frame Sizes R6 up to R8)

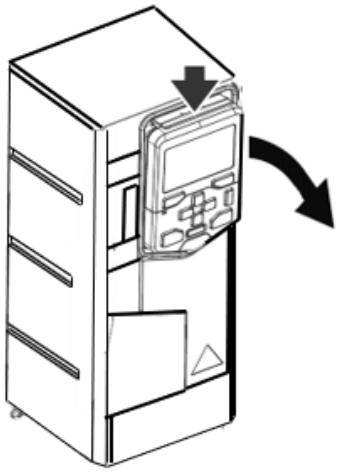

Fig. 18 — Auxiliary Fan Remove (Frame Sizes R1, R2, R3, R4 and R5)

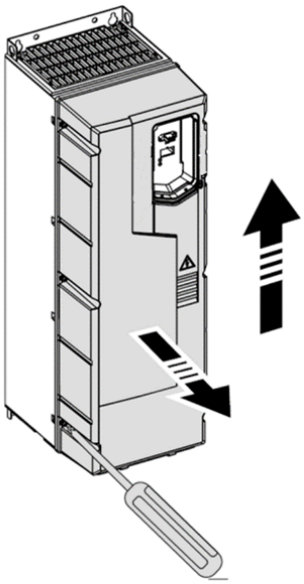

Fig. 19 — Drive cover Remove (Frame Sizes R1, R2, R3, R4 and R5)

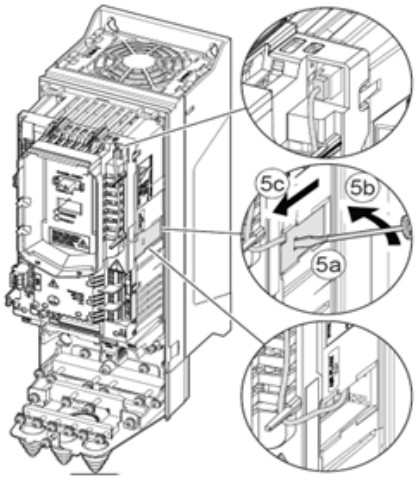

Fig. 20 — Auxiliary Fan Remove (Frame Sizes R1 and R2)

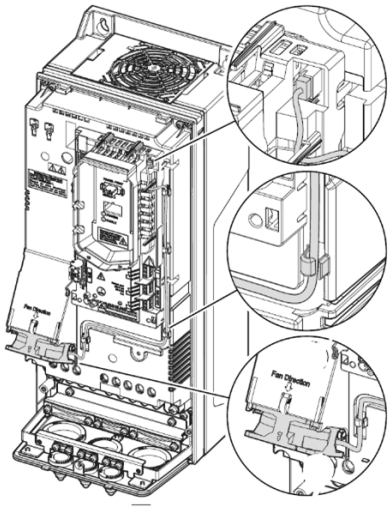

Fig. 21 — Auxiliary Fan Remove (Frame Sizes R3)

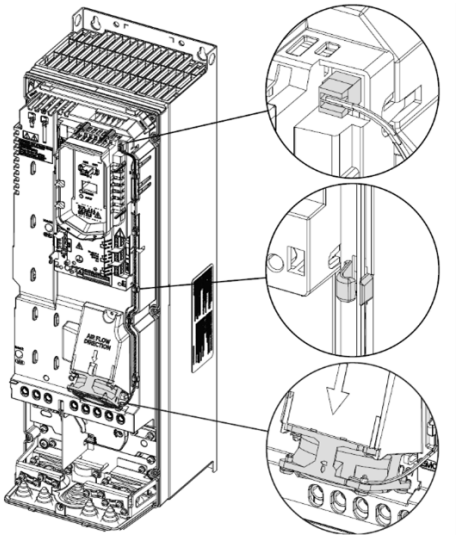

Fig. 22 — Auxiliary Fan Remove (Frame Sizes R4 and R5)

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

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