Inputs and Outputs

Q. How many analog inputs are on a 590+?

A. The 590+ has five analog inputs, four configurable and one dedicated, rated for ±10VDC, 1mA. All analog inputs have 12-bit resolution, (plus sign bit). approximately 2.5mV/resolution. The inputs are scanned approximately every 10 milli-seconds. The dedicated input connects directly to the SPEED LOOP or CURRENT LOOP (Analog Input 2 (A3)) and is scanned every 3 milli-seconds.

Q. How many analog outputs are on a 590+?

A. The 590+ has three analog outputs, two configurable and one dedicated, rated for ±10VDC, 5mA. The dedicated output connects directly to the CURRENT LOOP. The outputs are scanned approximately every 10 milli-seconds. The analog outputs have 11-bit resolution (plus sign bit).

Q. How many digital inputs are on a 590+?

A. The 590+ has nine digital inputs, six configurable and three dedicated, rated at +24VDC, 100mA. The inputs are sampled approximately every 10 milli-seconds. The three dedicated inputs are connected to the Coast Stop (B9), Program Stop (B8), and Start (C3).

Q. How many digital outputs are on a 590+?

A. The 590+ has three digital outputs, all three are configurable, rated at +24VDC, 100mA (30VDC max).

    Note: The digital outputs are sourcing.

Specifications

Q. What are the reference power supplies available to terminal connections on the 590+?

A. The 590+ has ±10 VDC, +24 VDC supplies available to terminal connections.

Q. What is the current overload rating for the 590+ drive?

A. The 590+ has an overload rating of 200% for 10 seconds and 150% for 30 seconds.

Q. What are the minimum and maximum 3-phase input voltage ratings?

A. The 590+ voltage rating is 220-500VAC (±10%) for the 15 amp through 675 amp rated drive. The 590+ voltage rating is 380-690VAC (±5%) for the 850 amp through the 2400 amp rated drive.

Q. What is the operating temperature for the 590+?

A. The 590+ temperature rating is 0°C to 45°C (32°F-113°F) for the 15 amp through 675 amp rated drive. The 590+ temperature rating is 0°C to 40°C (32°F - 104°F) for the 850 amp through the 2400 amp rated drive.

    Note: The drive has to be derated linearly 1% per degree centigrade from 45°C (113°F) up to a maximum of 55°C (131°F).

Q. What is the maximum operating altitude for the 590+?

A. The maximum drive operating altitude is 5000m (1640 ft).

    Note: The drive has to be derated linearly 1% per 200 meters above 500m to a MAXIMUM of 5000m (16400 ft).

Q. What safety standards do the 590+ meet?

A. The 590+ meets the CE, UL, and c-UL standards.

If you have questions, please call the Product Support Group at (704) 588-3246.

General Information

Q. How can the 590+ be configured?

A. The 590+ can be configured using the 4-button keypad or DSELite software.

Q. How can I receive the DSELite software?

A. Visit http://www.ssddrives.com/usa then go to the *Resource Center / Software Downloads.*

Q. What options can be added to the 590+?

A. Speed Feedback, Communications, Remote mounting kit for the keypad, Dynamic Brake Contactor, Control transformer, and Blower Motor Starter are options for the 590+.

Q. What are the types of Speed Feedback for the 590+?

A. The Speed feedback options are Encoder, Analog Tachometer and Armature Voltage.

Q. What are the Communication options for the 590+?

A. The 590+ has Communication Techboxes for Link, Profibus, DeviceNet, ControlNet, CanOpen, LonWorks, Ethernet IP, Ethernet Modbus TCP, ModbusPlus and Serial (Modbus RTU/EI Bisynch)

Q. Is the keypad detachable during operation?

A. Only if the drive is being controlled through the remote terminal connections.

Q. What are the differences between the 590 and 590+?

Only the frame 1 & 2 590+'s has an AC input contactor.

The keypad is detachable on all 590+ drives.

The 590+ frame 1 & 2 has been repackaged for a smaller footprint.

The frame 1 590+ has no external field connections for field weakening.

The thermistor input is isolated on all 590+'s.

3-phase and auxiliary voltage connections are located at the bottom of the 590+.

Digital output capacity has been increased to 100ma.

Dynamic Brake Contactor, Control transformer are options on the 590+.

Note: On frame 1 & 2 the isolated thermistor input is located on the fuse board. On frame 3 and bigger the thermistor input is on the control door.

Q. What are the communication settings for the 590+ for the P3 Port?

A. The baud rate is 9600. The communication mode is (EIASCII).

Q. Can you download a DSELite file into the drive when the drive is Running?

A. No, but you can EXTRACT data from the drive, using DSE Lite while the drive is running..

Q. Can I upgrade my existing 590 to a 590+?

A. Yes, the control door would be the main component to upgrade. The control door part number is 590PXD/0010/UK/0.

Note: Using the chart below, verify the Power Supply Board modification level is at least or higher by referencing the label on the Power Supply Board.

Part Number	Modification Level
AH385851	14
AH385621	12
AH466001	4

AH385851U002   17   **This is the modification level.

0029   960/038   01   17

Note: Any drive with an AH385128Uxxx can not be upgraded to add a 590+ control door.

If you have questions, please call the Product Support Group at (704) 588-3246.

SSD
DRIVES

Troubleshooting

Q.　The 590+ is enabled, but the main contactor doesn't close. Why?

A.　Verify minimum wiring connections.　Are B8 and B9 connected to 24VDC?

Q.　How can the drive configuration be reset to factory defaults ?

A.　Hold the Up and Down arrows buttons on power up of the drive. Release the arrow buttons when the display reads "calibrating".　The second method　is to install a default template from the software DSELite.

Q.　The drive faults to "over-voltage" after the drive is enabled.　Why?

A.　There is an "open" in the armature circuit.　Verify no open in the armature circuit between the drive and motor using a voltmeter.

Q.　The drive faults to "3-phase fail" after the drive is enabled.　Why?

A.　The three-phase voltage isn't present at the input of the drive. Verify the 3-phase voltage at terminal L1,L2,and L3 and check all fuses.

Q.　The drive faults to "speed feedback", Why?

A.　The tachometer or encoder may be bad.　Switch the drive speed feedback to armature voltage, and then verify normal operation.

If you have questions, please call the Product Support Group at (704) 588-3246.

590+ DRV Series DC Drive – 220-660 VAC ±10%; 50-60 Hz ±5%

FRAME SIZE		1	2	3	4	5	7
Dimensions	(RG)	373 x 196 x 229 14.7 x 7.7 x 9	500 x 196 x 295 19.7 x 7.7 x 11.6	686 x 432 x 241 27 x 17 x 9.5	1092 x 549 x 386 43 x 21.6 x 15.2	1422 x 965 x 470 56 x 38 x 18.5	1727 x 1524 x 457 68 x 60 x 18
	(NRG)						1422 x 1422 x 457 56 x 56 x 18
Weight (Kg./Lb.)		8.2 / 18	17 / 36	82 / 180	191 / 420	261 / 575	??? / ???
Encl. Protection		IP20	Open Chassis				
Mounting Options		Panel					
Cooling Fan		Internal					External – 120V
Supply		Three-Phase					

POWER RATINGS						
HP at 230 VAC	3 – 10	15 – 50	60 – 75	100 – 250	–	–
HP at 460 VAC	7.5 – 20	30 – 100	125 – 150	200 – 500	600 – 900	600 – 1500
HP at 575 VAC	–	–	–	250 – 600	700 – 1100	700 – 1750
HP at 660 VAC	–	–	–	–	–	900 – 2000
Current	15 – 35	55 – 165	206 – 246	360 – 815	1000 – 1500	1050 – 2400

FIELD SUPPLY RATINGS						
Volts	Adjustable from 0 – 90% VDC of input supply (default is 90%)					
Current	4	10	10	30	30	60
External Supply Connection	No	Yes				

OPTIONS AND TECHNICAL SPECIFICATIONS	
Keypad Type	6901 – Standard remote mountable, does not hold configuration
Control Supply TX	Optional 220/240/440/480 – 110/120 Standard
Supply Fuses	Standard
Armature Fuse	Standard – Regenerative units only
Contactor	AC 3-pole DC 200/250 hp frame 4 has 3 pole DC, 300 hp and higher has DC 1-pole DC
DB Contact	Need external option Standard Need external option
Blower Starter Option	Yes
Ambient	0-45°C (32-113°F); Derate 1% per °C to 55°C (131°F) maximum 0-40°C (32-104°F); Derate 1% per °C to 55°C (131°F) maximum
Altitude	500m (1640 ft.) ASL; derate 1% per 200m (656 ft.) above 500m (1640 ft.) to 5000m (16400 ft.) max.
Overload	200% for 10 seconds, 150% for 30 seconds

INPUTS AND OUTPUTS	
Analog Inputs	Five; one dedicated for Speed or Current Demand, four configurable; 12-bit, 0 – 10 or ±10 VDC at 1mA, 10ms, 100K ohms impedance
Analog Outputs	Three; one dedicated for Armature Current Output, two configurable; (0 – 10 or ±10 VDC); 10 bit, 5mA
Digital Inputs	Nine; four dedicated (Program Stop / Coast Stop / Start / Run), five configurable; 15mA at 24 VDC, 10ms, 4.7K ohm impedance
Digital Outputs	Three configurable; 24 VDC, 10ms, 100mA
Thermistor Input	Isolated (TH1, TH2 only)
Speed Feedback Option Cards	Analog Tachometer (AH385870U001) for 10-199V AC or DC tachometers
	Encoder (AH387775U0xx – xx = 05, 12, 15, or 24); Line driver output, 100 kHz, 10mA per channel Acrylic Microtach (AH386025U002), Glass Microtach (AH386025U001); 100 kHz,

STANDARDS (SEE PRODUCT MANUAL FOR INSTALLATION REQUIREMENTS TO MEET REQUIRED STANDARDS)	
UL & cUL (Canada)	Listed component under UL508C (industrial control equipment)
EMC Standards	EN55011 (1991), EN50081-2 (1994), EN50082-2 (1995)
CE	EN50178 (1998) and EMC standards (when used as stand-alone equipment) EN60204-1 and EMC standards (when used as part of other equipment)

SOFTWARE AND COMMUNICATIONS	
Setup	Configuration using the keypad or software (DSELite) of all function blocks
Communication	P3 programming port included
Techbox Options	Link, Profibus, DeviceNet, ControlNet, CanOpen, LonWorks, Ethernet IP, Ethernet Modbus TCP, ModbusPlus and Serial (Modbus RTU/EI Bisynch)

590+ Series DC Controller – 220-660 VAC ±10%; 50-60 Hz ±5%

FRAME SIZE		1	2	3	4	5	7
Dimensions	(RG)			500 x 300 x 211 19.7 x 11.8 x 8.3	700 x 253 x 358 27.6 x 10 x 14.2	700 x 506 x 358 27.6 x 20 x 14.2	1407 x 851 x 349 55.4 x 33.5 x 16.4
	(NRG)						955 x 851 x 349 37.6 x 33.5 x 16.4
Weight (Kg/Lb.)	(RG)			82 / 180	191 / 420	261 / 575	288.5 / 636
	(NRG)						178.5 / 394
Encl. Protection				Open Chassis			
Mounting Options				Panel			
Cooling Fan				Internal			External – 120V
Supply				Three-Phase			
POWER RATINGS							
HP at 230 VAC				60 – 75	100 – 250	–	–
HP at 460 VAC				125 – 150	200 – 500	600 – 900	600 – 1500
HP at 575 VAC				–	250 – 600	700 – 1100	700 – 1750
HP at 660 VAC				–	–	–	900 – 2000
Current				246	380 – 830	1580	1050 – 2400
FIELD SUPPLY RATINGS							
Volts				Adjustable from 0 – 90% VDC of input supply (default is 90%)			
Current				10	30	30	60
External Supply Connection				Yes			

OPTIONS AND TECHNICAL SPECIFICATIONS

Keypad Type	6901 – Standard remote mountable, does not hold configuration
Ambient	0-45°C (32-113°F); Derate 1% per °C to 55°C (131°F) maximum / 0-40°C (32-104°F); Derate 1% per °C to 55°C (131°F) maximum
Altitude	500m (1640 ft.) ASL; derate 1% per 200m (656 ft.) above 500m (1640 ft.) to 5000m (16400 ft.) max.
Overload	200% for 10 seconds, 150% for 30 seconds

INPUTS AND OUTPUTS

Analog Inputs	Five; one dedicated for Speed or Current Demand, four configurable; 12-bit, 0 – 10 or ±10 VDC at 1mA, 10ms, 100K ohms impedance
Analog Outputs	Three; one dedicated for Armature Current Output, two configurable; (0 – 10 or ±10 VDC); 10 bit, 5mA
Digital Inputs	Nine; four dedicated (Program Stop / Coast Stop / Start / Run), five configurable; 15mA at 24 VDC, 10ms, 4.7K ohm impedance
Digital Outputs	Three configurable; 24 VDC, 10ms, 100mA
Thermistor Input	Isolated (TH1, TH2 only)
Speed Feedback Option Cards	Analog Tachometer (AH385870U001) for 10-199V AC or DC tachometers
	Encoder (AH387775U0xx – xx = 05, 12, 15, or 24); Line driver output, 100 kHz, 10mA per channel Acrylic Microtach (AH386025U002), Glass Microtach (AH386025U001); 100 kHz,

STANDARDS (SEE PRODUCT MANUAL FOR INSTALLATION REQUIREMENTS TO MEET REQUIRED STANDARDS)

UL & cUL (Canada)	Listed component under UL508C (industrial control equipment)
EMC Standards	EN55011 (1991) EN50081-2 (1994) EN50082-2 (1995)
CE	EN50178 (1998) and EMC standards (when used as stand-alone equipment) EN60204-1 and EMC standards (when used as part of other equipment)

SOFTWARE AND COMMUNICATIONS

|	
Setup	Configuration using the keypad or software (DSELite) of all function blocks
Communication	P3 programming port included
Techbox Options	Link, Profibus, DeviceNet, ControlNet, CanOpen, LonWorks, Ethernet IP, Ethernet Modbus TCP, ModbusPlus and Serial (Modbus RTU/EI Bisynch)

Objective

Basic wiring for a 590+ Digital Controller to spin a motor.

Equipment

590+ Series DC drive, start-stop buttons/switches

Procedure

Follow the connection diagram shown below for basic control wiring for drive operation.
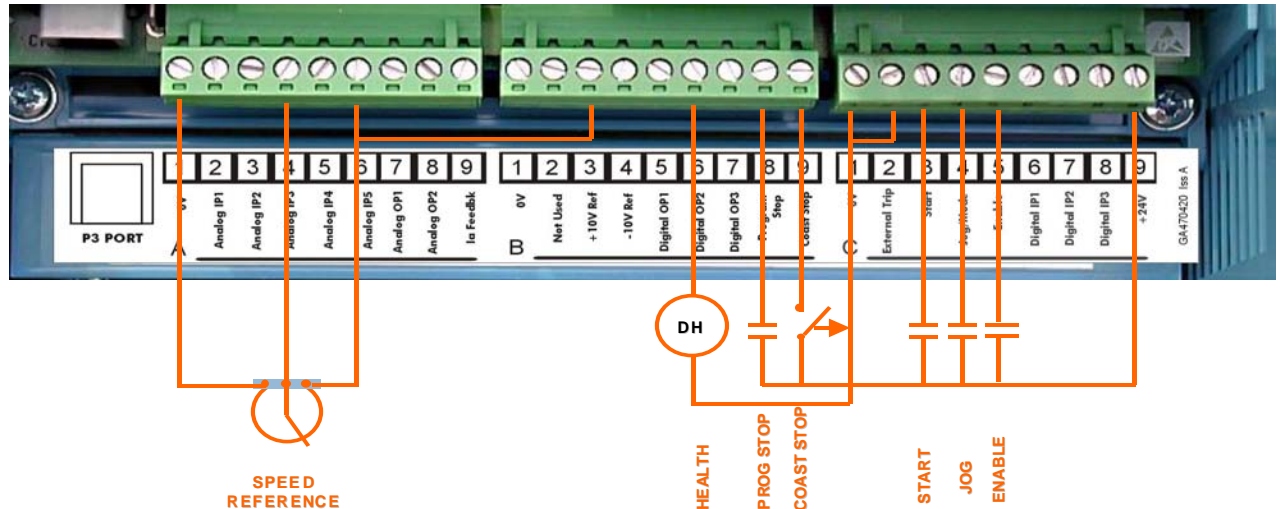
- E-Stop relay n.o. contact between B8, C9

- E-Stop relay n.o. TDD contact between B9, C9

- Jumper C1 and C2 if no external trip contact

- Start contact between C3 and C9

- Enable contact between C5 and C9

- Jog contact between C4 and C9

- Health relay coil (24V) between B6(+) and C1(-)

- Jumper A6 to B3

- A4 is the Line Speed Input

> Note: The stop circuit must be maintained to spin the motor using the start/enable or jog
> circuit.

If you have questions, please call the Product Support Group at (704) 588-3246.

Objective

To answer general information about the 590+ drive

Equipment

590+ DC Drive manual number HA466461U004

955+ DRV drive manual number HA470388U003

Problem: The drive will not spin the motor.

1. Have you verified the wiring connections −

2. Do you have a jumper from B3 to A6?

3. Is the RUN led on the keypad ON or Blinking?

4. Is the drive going into Current Limit?

5. Can you spin the shaft of the motor using your hand?

6. What type of device is controlling the speed input? (potentiometer, load cell, dancer, PLC)

7. What type of speed feedback is connected to the drive? (armature volts, tach, encoder)

8. Do you have voltage present on the field terminals?

9. Will the drive work in LOCAL mode using the keypad?

10. Using the keypad under Diagnostics verify the following while the drive is enabled to run:

     ❑ Speed Feedback _____%   ❑ At Current Limit True / False

     ❑ Speed Demand _____%   ❑ Start   True / False

     ❑ Current Demand _____%   ❑ ANIN 1 (A2)   _____%

     ❑ Current Fbk _____%   ❑ ANIN 2 (A3)   _____%

     ❑ Drive Start   True / False   ❑ ANIN 3 (A4)   _____%

   ❑ Drive Enable   True / False   ❑ ANIN 5 (A6)   _____%

If you have questions, please call the Product Support Group at (704) 588-3246.

Introduction

Frame 1 and 2 590+ drives have integrated control boards housed in a cradle, part number LA470617Uxxx, picture shown below. Larger drive chassis are fitted with a 590+ control door, very similar to the 590 door. This application note explains how to replace and calibrate the 590+ control cradle. Unlike the 590, the calibration for armature current, armature voltage and field current are now done exclusively in software.

590+Cradle LA470617Uxxx
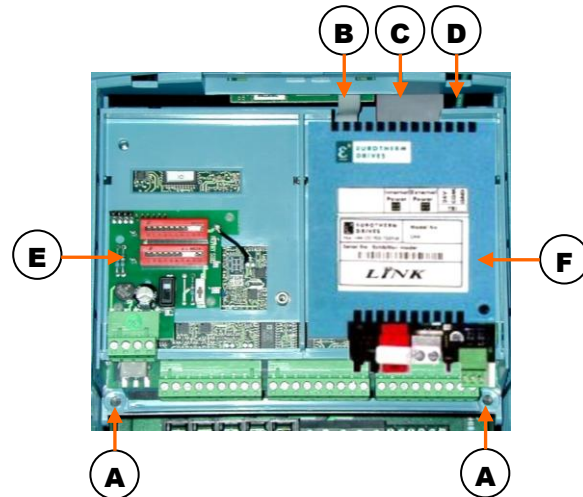
Removing and Replacing

1. Remove the terminal cover of the drive, to access the control cradle
2. Remove the two Philips screws (A) in the picture
3. Slide the cradle downwards approximately 1 inch, while lifting it slightly
4. Unplug the two headers (B) and (C). Remove the ground wire (D) with a firm tug. The cradle is now free to remove.
5. Remove any feedback board (E) and techbox (F) if present, and mount them on the new cradle
6. Follow steps 1 through 4 in the reverse order to install the new cradle
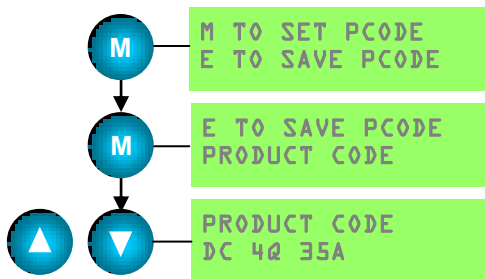
CAUTION
Remove power from the drive before attempting to replace the cradle

CAUTION
Do not touch the exposed circuit board on the underside of the cradle

CAUTION
Insert header C with caution. Damage to pins may lead to drive failure

Setting the Product Code

1. Hold down the **UP**, **E** and **PROG** buttons simultaneously and apply power to the drive.

2. You should see

M → `M TO SET PCODE`
        `E TO SAVE PCODE`

M → `E TO SAVE PCODE`
        `PRODUCT CODE`

▲ **▼** → `PRODUCT CODE`
            `DC 4Q 35A`

Sample Catalog Number

955+8R0100

R = Regen
N = Non-regen

4 digits for HP
0100 = 100HP

HP @ 500V	Max DC amps
7.5	15
20	35
25	40
30	55
40	70
50	90
60	110
75	125
100	165

3. Using the **UP** and **DOWN** keys, scroll to the appropriate current rating of the drive (refer to the rating label on the side panel of the drive) and 4Q for regenerative or 2Q for non-regenerative. For a 20HP regenerative drive, select DC 4Q 35A

4. Press **E** twice to save the setting.

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Issue 2.1
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Replacing Control Board
Document Number: 4305

Product: 590+, 955+
Keywords: Quality

SSD
DRIVES

Calibration

Now that the Product Code has been set, it is time to calibrate the drive in the Configure Drive Menu.

The 590+ can also be calibrated using the programming tool software

DIGITAL DC DRIVE **DC 4Q 165A**	This is the power-up welcome screen
(M) **DC 4Q 165A** **MENU LEVEL**	Press the M key to get to MENU LEVEL
(M) **MENU LEVEL** **DIAGNOSTICS**	Press M. You are in MENU LEVEL, at DIAGNOSTICS
(▲) **MENU LEVEL** **CONFIGURE DRIVE**	Up arrow to get to CONFIGURE DRIVE menu
(M) **CONFIGURE DRIVE** **CONFIGURE ENABLE**	Press M and up arrow to ENABLE drive configuration All 7 LEDs blink in Configuration mode. Press E when done
(▼) **NOM MOTOR VOLTS**	Using the Up & Down arrows, enter rated motor voltage
(▼) **ARMATURE CURRENT**	Enter rated motor armature current
(▼) **FIELD CURRENT**	Enter rated field current. Skip if field is in Voltage mode
(▼) **FLD. CTRL MODE**	Toggle between voltage and current modes
(▼) **FLD. VOLTS RATIO**	If in voltage mode: Ratio = (field volts/AC supply)*100 Example: For a 300V field and 460V supply: Ratio = 300/460*100 = 65%
(▼) **CUR.LIMIT/SCALER**	Enter desired current limit setting. Usually 100%
(▼) **AUTOTUNE**	Leave this OFF. Autotune after calibration is complete
(▼) **SPEED FBK SELECT**	Choose from Armature Volts/Analog Tach/Encoder
(▼) **ENCODER LINES**	Enter the pulses per rev. rating of the encoder
(▼) **ENCODER RPM**	Enter the max speed here. Corresponds to 100% speed
(▼) **ENCODER SIGN**	Change the polarity of the encoder signal
(▼) **SPD. INT TIME**	Speed loop integral gain
(▼) **SPD. PROP GAIN**	Speed loop proportional gain

- Set CONFIGURE ENABLE to DISABLE. The drive will display "CALIBRATING"
- Under MENU LEVEL/PARAMETER SAVE, press the M and UP to save your settings

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Issue 2.1
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Objective

Provide information on feedback alarms for the customer to protect against motor overspeeding.

Equipment

590+ DC Drive, computer with DSELite installed.

Additional Protection against loss of speed control

If excess speed can be hazardous to personnel or machinery under certain conditions, additional protection can be configured in the drive block diagram. The following sections provide details and an example for getting additional protection using digital outputs.

1. The *Speed Error*, in the Speed Loop function block can be monitored. If the *Speed Error* exceeds a preset *Threshold*, the drive is stopped. This Threshold is set by the parameter '*Threshold*' which is located in the Digital Output block.

    Note: The customer must use the digital output to interrupt the stop circuit.
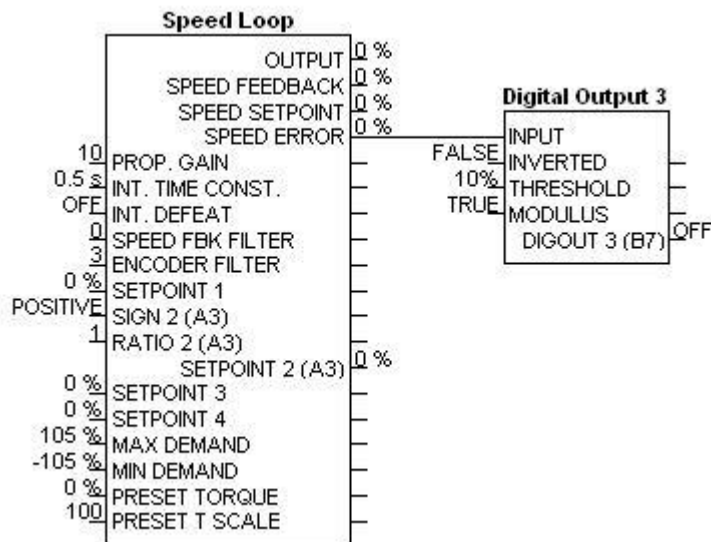
Note: Regardless of feedback device *Speed Demand − Speed Feedback = Speed Error*.

If you have questions, please call the Product Support Group at (704) 588-3246.

Over Speed Alarm

The *Over Speed* alarm trips if the *Speed Feedback* exceeds 125% for 0.1 second. This should never occur in normal speed control, as the speed demand is limited to 105%. Over Speed may occur if the speed loop is disabled by the *Torque Demand Isolate* or due to speed loop overshoot when the speed loop is not tuned to the load.

> Note: If the Speed Feedback is armature voltage, the Over Volts alarm may trip first as the Over Volts alarm trips when the armature volts exceeds 120% for 1.5 seconds.

> Important: Torque control with field weakening and an analog tach feedback is not recommended without speed limiting.

> Note: If the Speed Feedback is encoder, the Over Speed alarm trips when the encoder feedback reaches 125%.

> If the *Speed Feedback* is analog tach, the *Over Speed* alarm will not trip, as the maximum value of the analog tach is 110%. The Over Volts alarm will still operate at 120% armature volts but this may be more than 120% speed.

Speed Feedback Alarm

Field Weakening Disabled

The *Speed Feedback Alarm* trips if the difference between the *Speed Feedback* and the *Armature Volts* exceeds the *SPDFBK ALM LEVEL*, parameter in the *Calibration* block.

The *Speed Feedback Alarm* will not trip with armature voltage feedback because the armature voltage and the feedback are the same. Field weakening is not permitted with armature voltage feedback.

The default *SPDFBK ALM LEVEL* is 50%, i.e. if the *Speed Feedback* is at zero the trip will occur 0.4/sec after the armature voltage exceeds 50%.

If the feedback is reversed, the trip will occur at a lower level as the *Speed Feedback* and *Armature Voltage* are in the opposite direction; for example, if *Speed Feedback* is 25% and *Armature Volts* is –25%.

Field Weakening Enabled - using 590+ firmware version 5.x, 7.1 & 7.2

FLD WEAK ENABLE is the parameter in the *FIELD CONTROL* menu that selects constant hp operation above base speed by field weakening. If field weakening is used the armature volts are no longer proportional to speed so comparing them is no longer valid for checking Speed Feedback. With field weakening enabled the Speed Feedback alarm is not disabled but its method is changed.

The *Speed Feedback Alarm* trips if the *Speed Feedback* is less than 10% when the field is weakened; that is when operating above base speed.

> Notes: The Speed Feedback alarm delay is 0.4/sec.

> With field weakening enabled. If the *Speed Feedback* is zero (due to failed or disconnected tach or encoder) the drive will trip 0.4 sec after the field starts to weaken above base speed. This could be as high as full speed with a base speed close to full speed.

If you have questions, please call the Product Support Group at (704) 588-3246.

With a 3:1 field range, if the Speed Feedback is zero, the trip will occur above 33% speed. If the field range is only 1.1:1 the trip will occur above 90% speed.

Field Weakening Enabled - using 590+ firmware version 7.3 or greater.

FLD WEAK ENABLE is the parameter in the *FIELD CONTROL* menu that selects constant hp operation above base speed by field weakening.

The *Speed Feedback Alarm* trips if:

The *Speed Feedback* is < 0.1% while the *Armature Volts* feedback is greater than the *SPDFBK ALM LEVEL Threshold*. The default *SPDFBK ALM LEVEL* is 50%, i.e. if the *Speed Feedback* is <0.1% the trip will occur 0.4/sec after the *Armature Voltage* exceeds 50%. (This trip will occur below base speed operation).

And

The *Speed Feedback* alarm trips if the *Speed Feedback* is less than 10% when the field is weakened; that is when operating above base speed.

> Notes: The *Speed Feedback Alarm* delay is 0.4/sec.

> With field weakening enabled. If the *Speed Feedback* is zero (due to failed or disconnected tach or encoder) the drive will trip 0.4 sec after the field starts to weaken above base speed. This could be as high as full speed with a base speed close to full speed.

> With a 3:1 field range, if the *Speed Feedback* is zero, the trip will occur above 33% speed. If the field   range is only 1.1:1 the trip will occur above 90% speed. (This trip will occur below base speed operation).

If you have questions, please call the Product Support Group at (704) 588-3246.
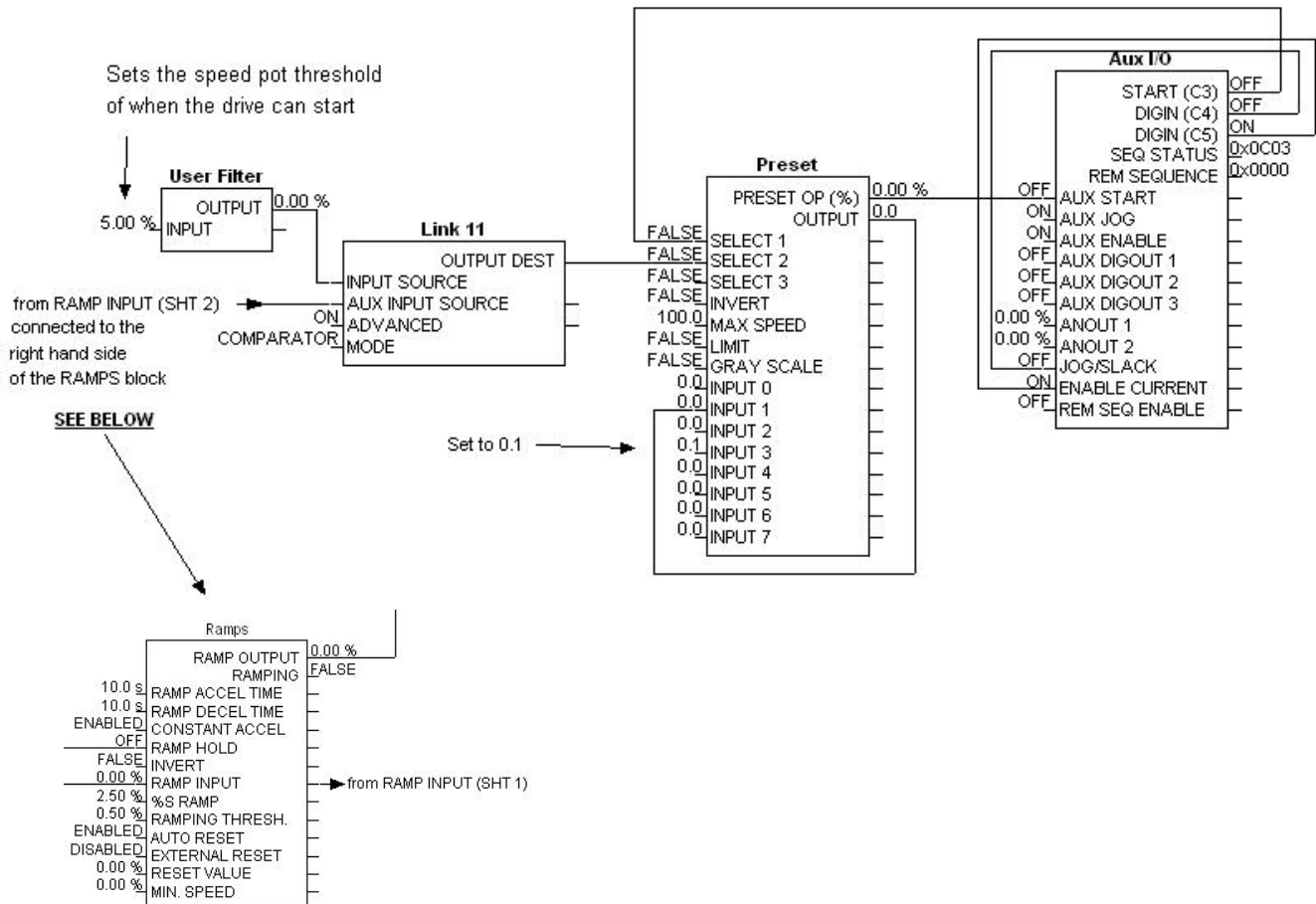
Objective

To configure a 590+ drive so the drive will not start until the speed pot is turned to a zero position.

Equipment

A 590+ drive with a firmware version of 7.x or greater and the software DSELite.

Procedure

1. Using DSELite and the "default7.590" template, configure the drive as shown below. These changes must be added to a default template.

2. Adjust the USER FILTER || INPUT parameter for the threshold level of where the speed pot must be positioned, before the drive will start. Once the speed pot is below this threshold, the drive will start and the speed pot can be adjusted for the desired speed.

If you have questions, please call the Product Support Group at (704) 588-3246.

Objective

The 3 phase 590Plus drive can be used to control motor fields for high current or bi-directional applications.

Applications include:

- High current motor fields.
- Generator fields.
- Alternator exciter windings.
- Magnet coils.

The 590+ field control provides the following advantages:

- High current capability.
- 2 or 4 Quadrant operation.
- Field forcing for fast response.

The 590+ has a software setup to optimize the control of large inductance loads with long time constants.

Procedure:

> Note: A normal constant horsepower field controller will use a non-regenerative (591+) controller, and a generator field controller, which needs to be bi-directional, will use a regenerative (590+) controller.

Setup for 2 Quadrant operation.

2 Quadrant operation provides unidirectional field current but applies negative volts for forcing when reducing the current.

Hardware:

1. A latching circuit may be required to ensure that the SCRs turn on with the long time constant. This should comprise a resistor and capacitor in series across the load. 1000ohms and 0.5uF is typical for the Frame 1, 35Amp 590+ at 460VAC. Less resistance and greater capacitance may be necessary at higher powers.
2. If a DC contactor is used between the drive and the inductive load a discharge resistor should be used with the normally closed DB pole to limit the voltage across the load if the contactor opens under load.

If you have questions, please call the Product Support Group at (704) 588-3246.

Software:

The following RESERVED Menu parameters must be set:

- 3 PHASE FIELD (tag476)= ENABLED

- I LOOP PI MODE (tag 163)= 1 (Increases the current loop gain by 10 times)

- SYSTEM HEALTH INHIBIT(tag 211) = 0X0002 (Disables missing pulse alarm)

- CUR CONTROL MODE = standard firing (tag 166) or SEL INT/CUR/SPD (tag166) = 3 (disables 210 deg firing), (depending on the firmware version of the drive, this parameter can be labeled as either)

Note: If a 590+ regenerative drive is being used, the following additional parameters must be set:

- MIN BS DEAD TIME (tag 101) = 6 (Maximum bridge switch time)

- SCAN THRESHOLD (tag 223) = 0 (Removes the scan)

- ZCD THRESHOLD (tag 214) = 3 (Zero current detector sensitivity)

> Note: A regenerative controller will have a delay of a few seconds between removing the Start or Enable and re-Starting or Enabling. This is because the SCR firing is suspended and the current will decay slowly. An alternative is to interlock removal of the Start with detection of zero current using a digital output.

The Field should be controlled in Current control using the Current Demand Isolate (located in the Current Loop block) and the demand connected to the direct Analog Input 2 terminal A3. The drive standard Field control (Field Enable in the Field Control block) should be disabled unless required for another motor.

The Program Stop B8 should not be used, it can be permanently connected to 24V (C9).The Start/Stop C3 should be tied to Coast Stop, B9 and both toggled for start/stop. This immediately switches off the current when the start/ stop goes low.

Commissioning:

The current loop tuning can be done manually as the Autotune probably will not work. The Discontinuous current is likely to be less than 5% and this parameter can be left at 0% if control is not required in this region. If control is required at very low currents, measure the level where the current becomes continuous and enter this value in the Current Loop menu.

Cycle the current demand between 10% and 50% and adjust the Current loop Proportional and Integral gains to give the best response using an oscilloscope connected to the IA Test point on the control board.

If you have questions, please call the Product Support Group at (704) 588-3246.

Application Note

Document Number: **4318**

Product: **590+**

Keywords: 3 Phase Field

SSD
DRIVES

Applications:

1.

Use as a high current field controller with a 590+ armature controller. The Field control, standby and Field weakening are performed in the armature controller, but the actual field current is generated by the external field controller.

The Field Control and Field Weakening should be Enabled in the Armature controller but the Field Fail should be inhibited.

The Field Demand, Tag 183, should be connected to an analog output and this should be wired to the analog input A3 of the Field Controller.

The Field controller, which uses its armature circuit for the field should have its Field Disabled. Start/Stop should be controlled by the drive isolate relay (timed from the E Stop). The Field controller health should be interlocked with the armature controller. This can be via a digital input that enables the Field Fail Inhibit when the Field is healthy. Thus a fault in the field controller will cause a Field Fail in the armature controller.

2 .

Use as a complete field controller with standby, field weakening and delayed turn off. This could be with an armature fed from a dc source other than a SSD drive. For this application, external armature voltage sensing is required. This is available on all 590+ frames except Frame 1.

The 590+ field control is self contained. It uses its own Field control except the Field Demand, Tag 183 is connected internally to the Additional Demand in the armature current loop and the I DMD Isolate is set True to disconnect the Speed loop. The Field Fail must be inhibited as the Field hardware circuit is not used.

The motor armature should be connected to the field controller, external armature sensing so that the motor terminal volts can be controlled above base speed.

If you have questions, please call the Product Support Group at (704) 588-3246.