1395 Connection Guide
Adapter Board Connections, Encoder Connections and Armature Current Ratings

Adapter Boards

Discrete Adapter Board
The Discrete Adapter Board is connected to Microbus Port A with wiring to external devices being accomplished at TB3, terminals 23 to 52.

The drive is shipped pre-configured, meaning that all of the inputs and outputs are linked to a predefined signal.

Figure 17 shows the 1395 standard configuration for the Discrete Adapter Board. The user has the flexibility to configure the drive for a particular application. Refer to the Discrete Adapter Manual for detailed information.

115V AC Connection- The 115V AC power source can be wired to be referenced or not referenced to common (zero volts) as shown in Fig. 16.

Figure 16
Typical 115V AC Digital Input Connections

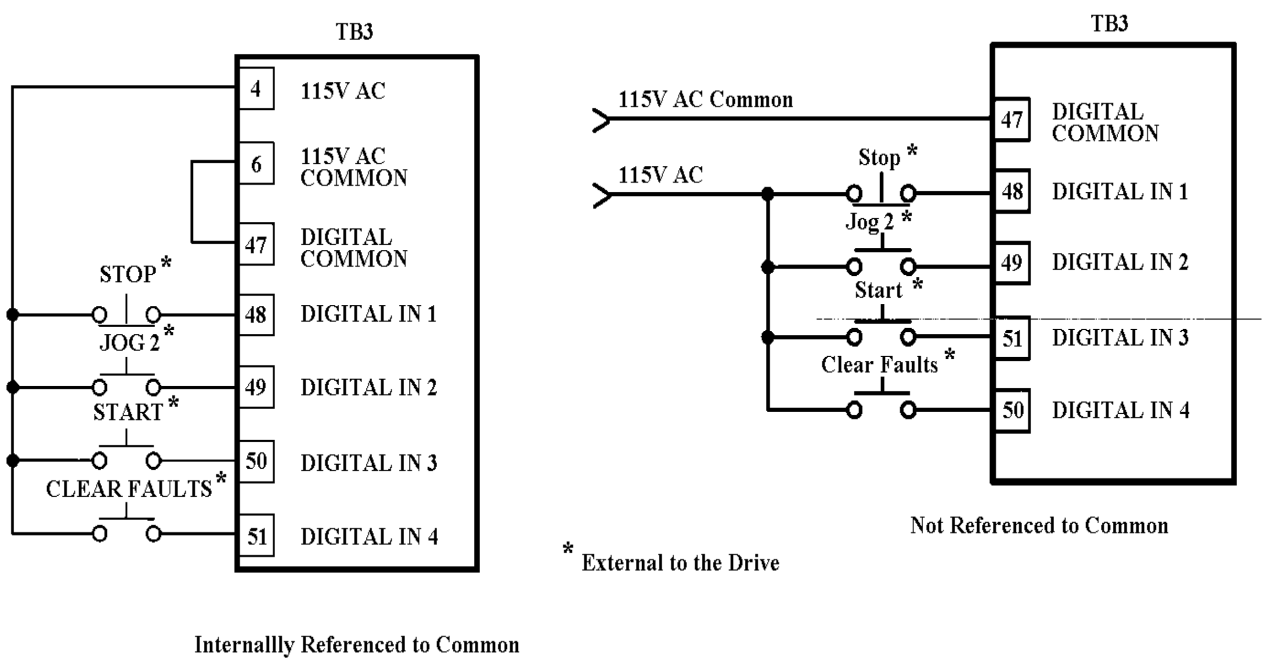
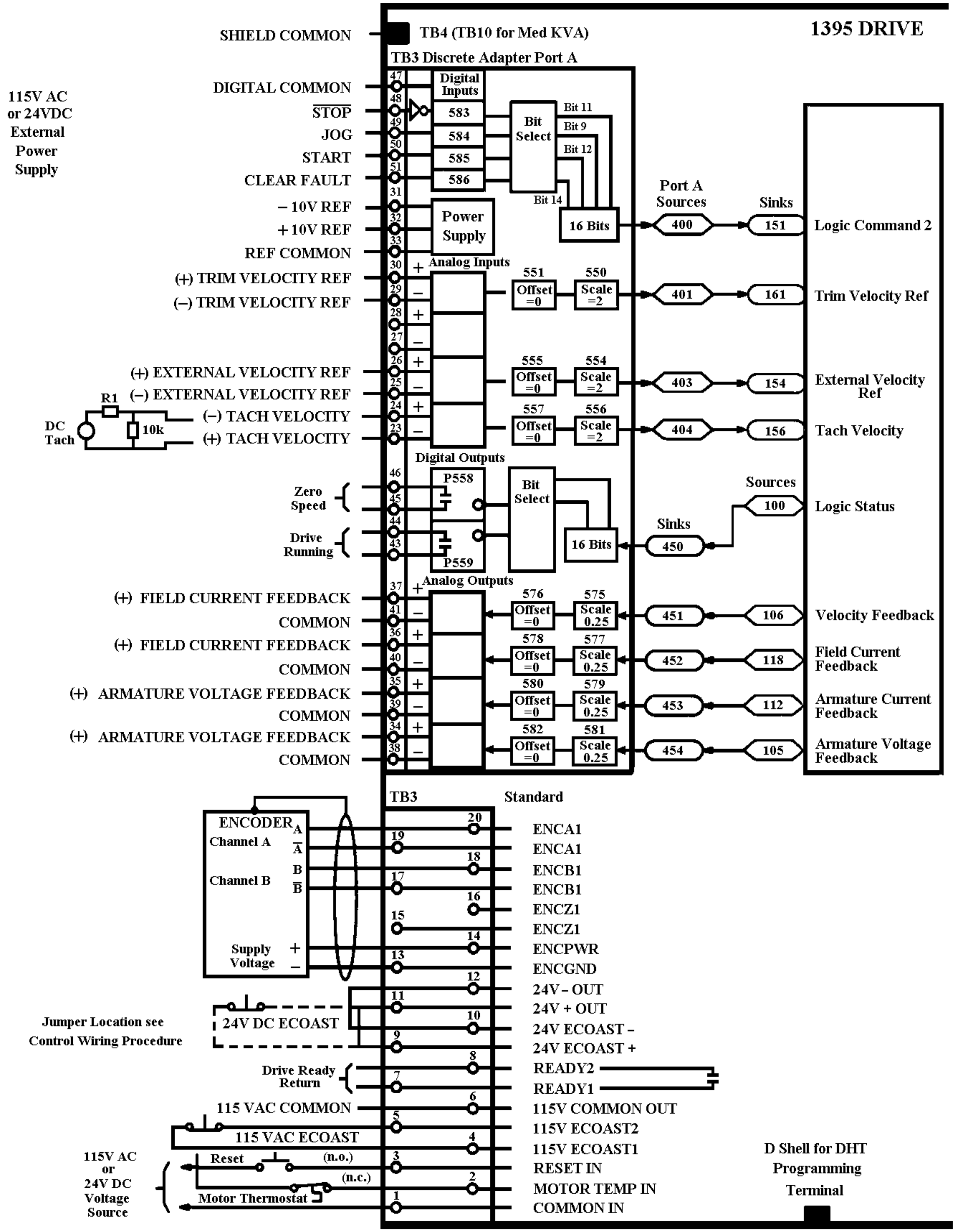


Figure 17
Discrete Adapter Board Configuration



24V DC Connection/Digital Input- Sizing of the power supply is based on the number of input and output selections. Figure 18 shows the typical connection of the digital input using the external power supply.

Analog Input- Velocity and Trim Reference. Connections for the velocity and trim reference inputs can be for uni- or bi-directional operation, using the internal drive±10V DC power supply (see Fig. 19).

Figure 18
Typical 24V DC Digital Input Connections using External Power Supply

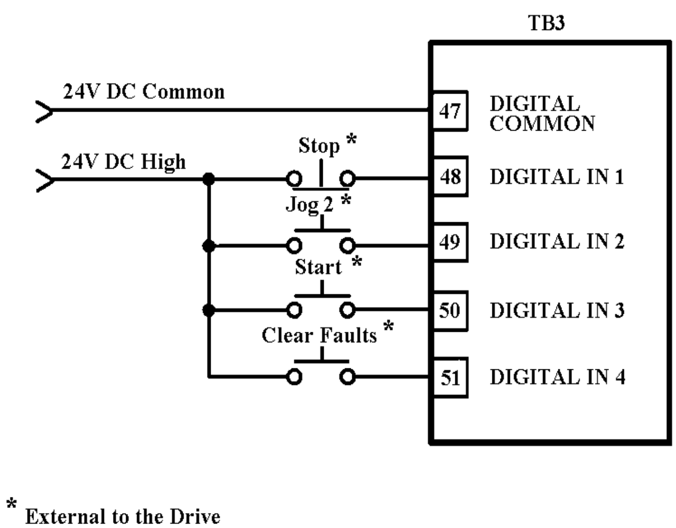
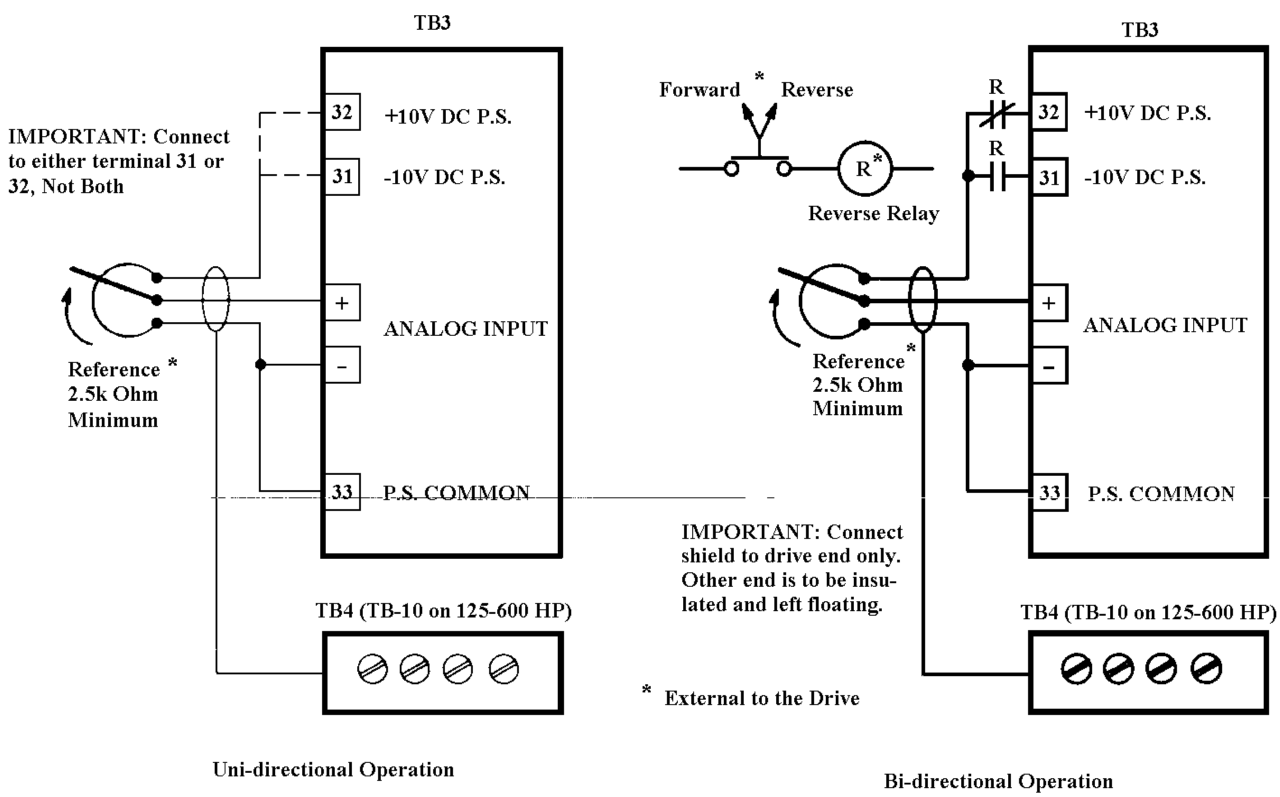


Figure 19
Typical Analog Input Connections



Tach Velocity - The analog tachometer device generates a DC voltage that is direction sensitive and proportional to speed. The tach output must be connected to an analog input channel on the Discrete Adapter Board. Most industrial tachs have an output greater than the ±10V range of the analog inputs. The tach output must be scaled down, by an external voltage divider network, so that the entire speed range of the motor can be represented by a + 9V feedback signal.

CAUTION: Connecting a tach which has an output range greater than ±10V directly to the analog input channel can severely damage the adapter board.

The tach signal then must be scaled in the adapter board to determine the proper relationship of output voltage/ motor velocity to base speed in Drive Units. This scaled configuration data must then be linked to Parameter 156 "Tach Velocity."

Many problems relate to the scaling of the tach signals. Below is a procedure for checking the scaling of the analog tach feedback for proper drive operation.

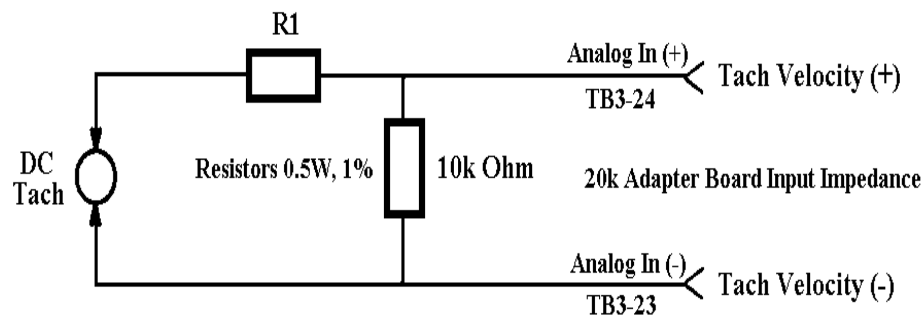
1. Determine the Volts/RPM rating of the tach (refer to tach name plate). Multiply this rating times the absolute maximum speed the motor will be commanded to accelerate to. This value should also be programmed in Parameter 607 "Rev Speed Lim" and 608 "Fwd Speed Lim" to assure that the velocity command will be properly clamped.

   Volts/RPM Rating x Max Speed = Max Volts Output

2. The Max Volts output must then be scaled to a level within the ±10V analog input channel range. This can be accomplished by using a voltage divider network external to the drive. The voltage divider will take the Max Volts output and scale it to a maximum 9V input. This allows for protection against 10% overshoot.

Figure 20 uses a 10k ohm resistor across the input channel. R1 represents the dropping resistor for the scaling network. To determine the value of R1 use the equation that follows (R1 should be rated for 0.5W, 1%).

Figure 20
Scaling Circuit



$$\frac{(\text{Max Volts Output}) \times 6666}{9\text{V}} - 6666 = \text{R1}$$

3. The analog input channel on the adapter board must now be scaled to represent an accurate velocity feedback signal. First determine the analog input signal for base speed. Parameter numbers are given in ( ) where applicable.

$$\frac{\text{Base Motor Speed (606)} \times 9\text{V}}{\text{Max Speed}} = \text{Base Speed Input}$$

4. The input voltage at base speed is then converted to Raw Adapter Units according to the following equation.

$$\frac{\text{Base Speed Input} \times 2048}{10} = \text{Raw Adapter Units}$$

5. The Raw Adapter Units are then used to determine the correct scaling parameter value according to the equation below.

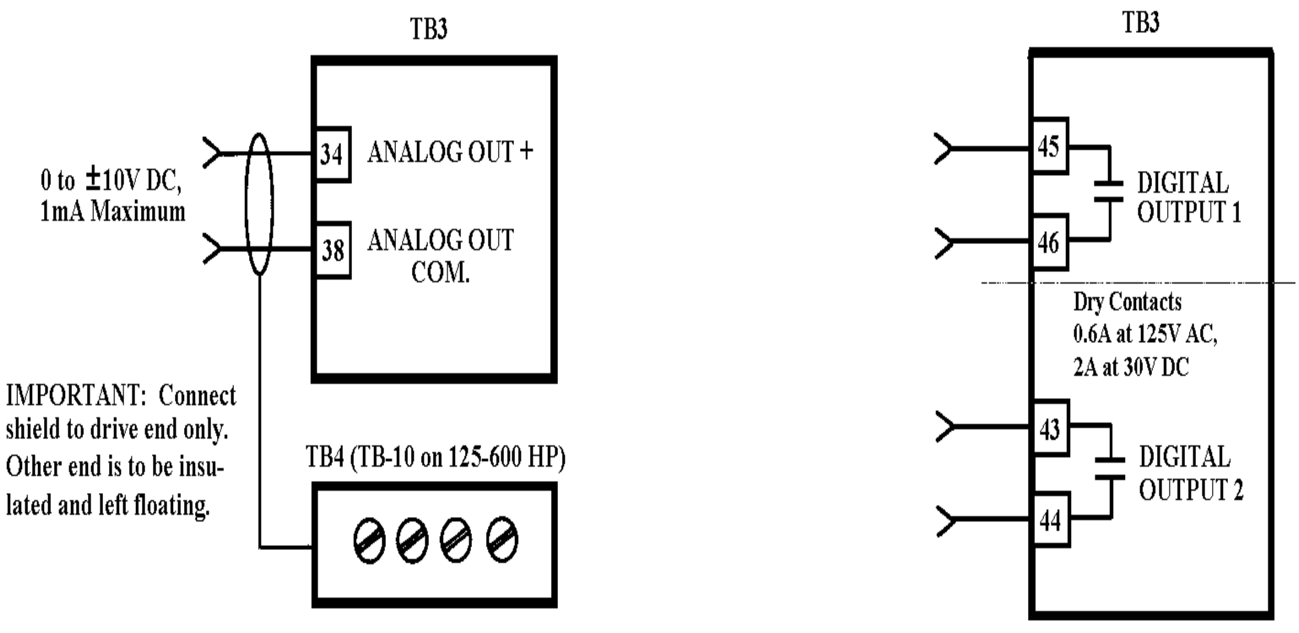
$$\frac{4096}{\text{Raw Adapter Units}} = \text{Scaling Parameter Value}$$

6. The Scaling Parameter Value should then be entered into the associated analog input scaling setup parameter. This procedure will be correct to within 5%. Verify that the scaling is correct by measuring the actual motor velocity with a hand tachometer. Fine tune the scaling by adjusting the appropriate value to minimize any error.

7. Any drift at zero speed can be minimized by adjusting the offset parameter associated with the channel in use.

Analog Output- Figure 21 shows typical analog and digital output connections.

Figure 21
Typical Output Connections



Analog Output Connections

Digital Output Connections

Reference Adapter Board
The Digital Reference Adapter Board is connected to Microbus Port A with wiring to external devices at terminals 23 to 62 of TB3.

The drive is shipped pre-configured, meaning that all of the inputs and outputs are linked to a predefined signal.

Figure 23 shows the 1395 standard configuration for the Digital Reference Adapter Board. The drive has the flexibility to be reconfigured for the application or as required.

24V DC Connection- A properly sized 24V DC power supply is required to power the 24 volt inputs.

Digital Reference Input- The Digital Reference Adapter Board contains one digital reference command for the drive. The board is set up by default for the encoder input signal to be single channel, dual edge (i.e. both the rising and falling edges are used by the counting logic). The hardware is configured for +5V DC signal inputs with jumpers J6 and J7 in the 1-2 position. For a +12V DC signal the jumpers must be placed in the 2-3 position.

ATTENTION: To guard against possible component damage, assure that jumpers are positioned correctly.

Figure 22 shows the typical encoder connection used as a signal for the digital reference input. This encoder can be machine mounted or mounted on the motor of the lead section.

Figure 22
Encoder Connections

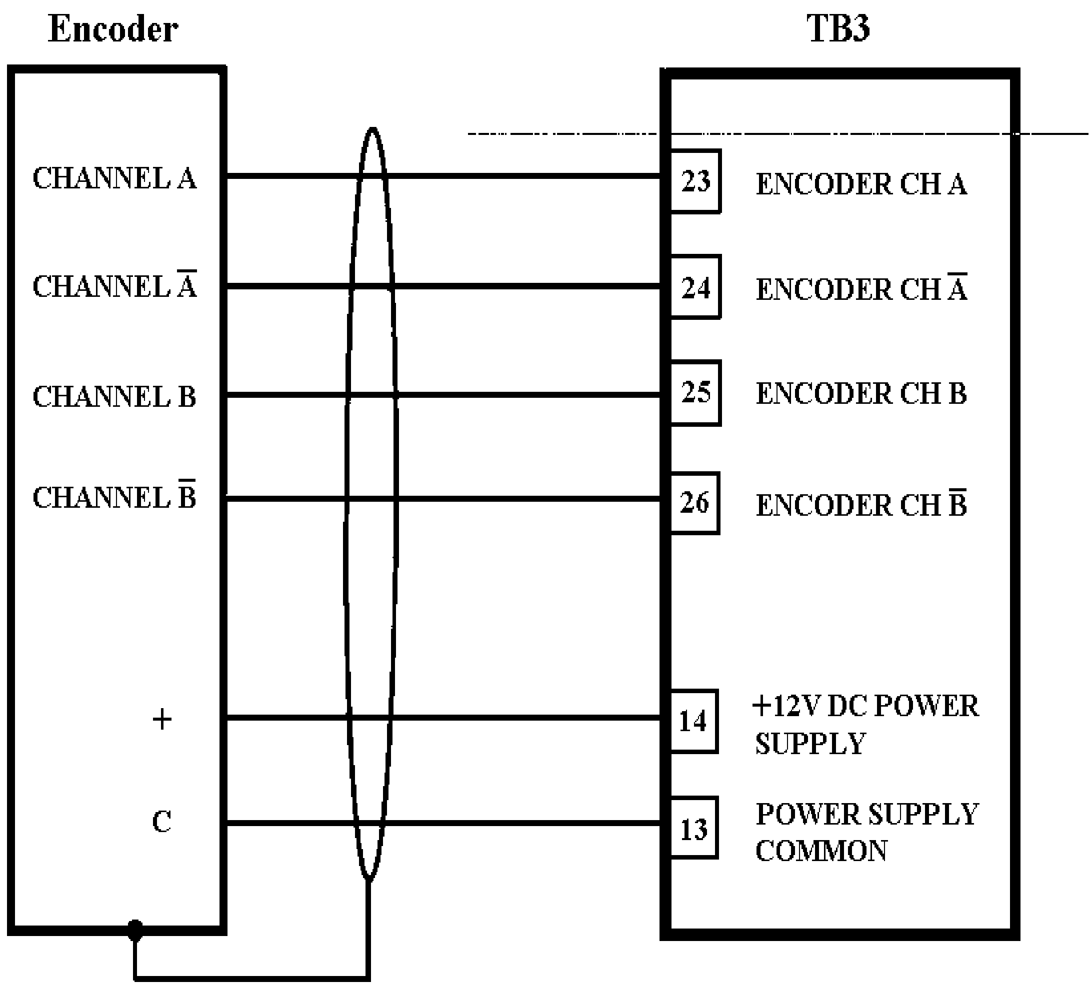


Figure 23
Example Digital Reference Adapter Board Configuration

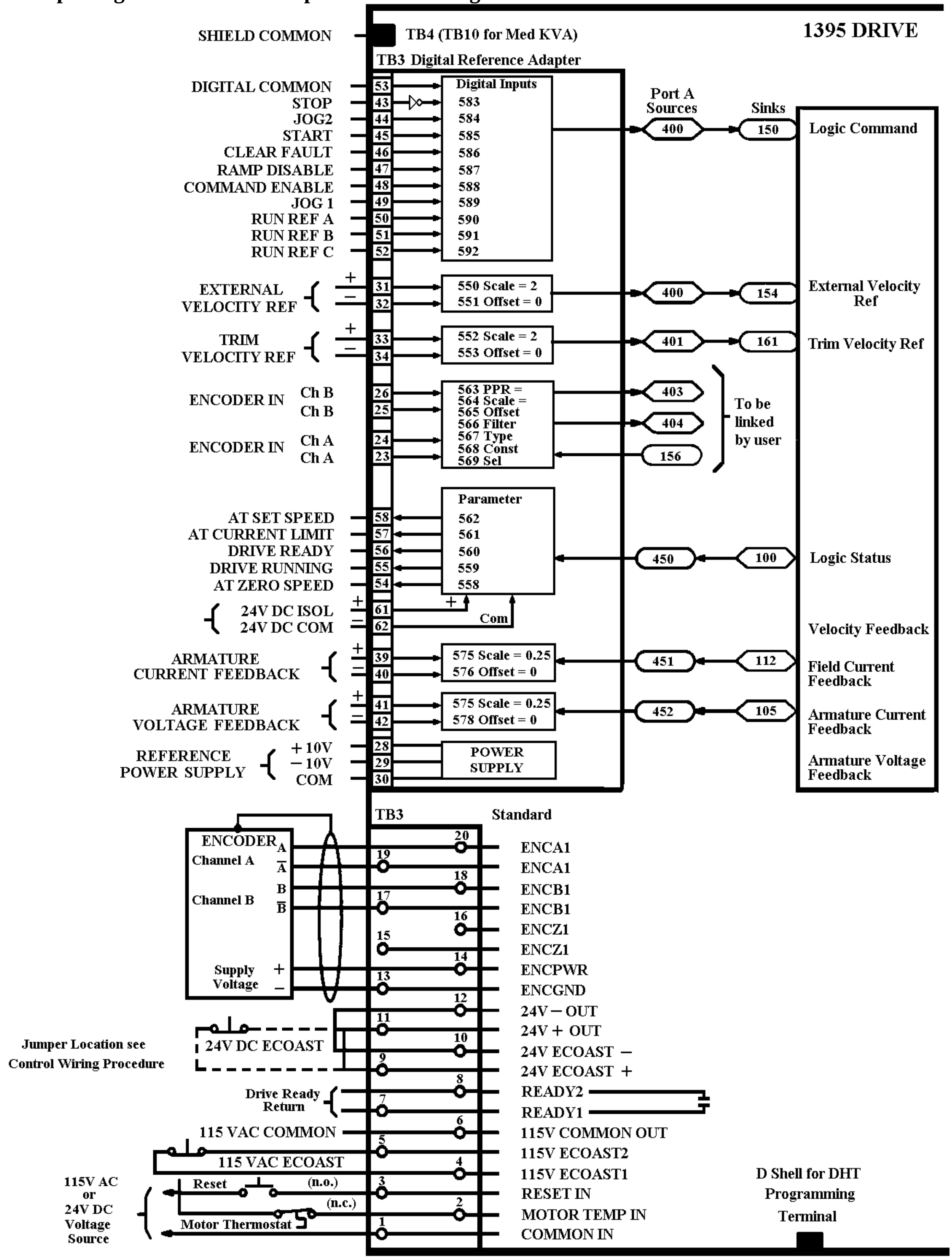
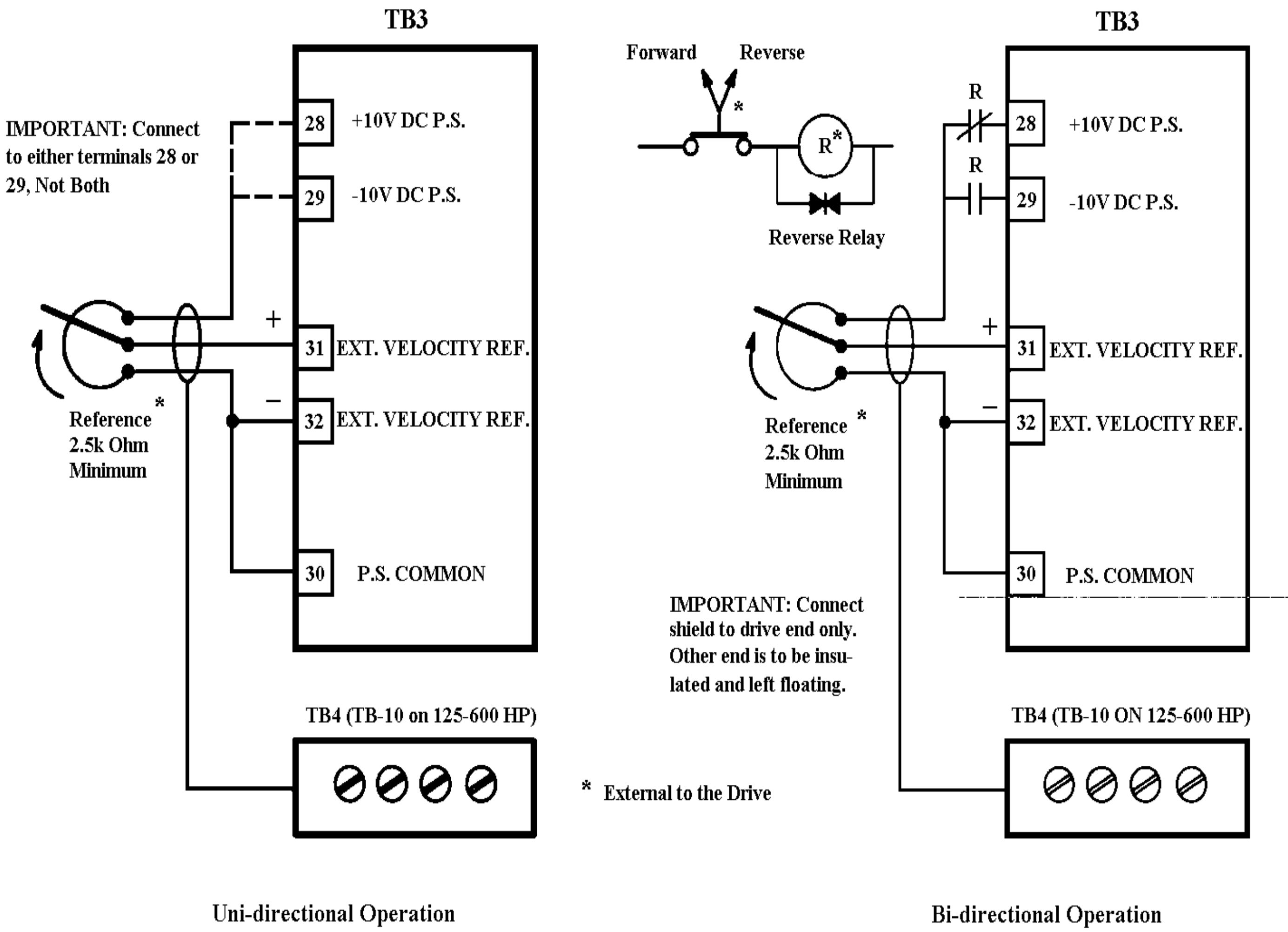


Figure 24
Typical Analog Input Connections



Analog Input- Velocity and Trim Reference

Connections for the velocity and trim reference inputs can be for uni-directional or bi-directional operation, using the internal drive +10V DC power supply (see Figure 24).

Tach Velocity - The Digital Reference Adapter Board is not preconfigured for DC tachometer feedback. The user will have to reconfigure the drive by replacing the Trim Velocity Reference (parameter 161) with the Tach Velocity (parameter 156).

The analog tachometer device generates a DC voltage that is direction sensitive and proportional to speed. The tach output must be connected to an analog input channel on the Discrete Adapter Board. Most industrial tachs have an output greater than the ±10V range of the analog inputs. The tach output must be scaled down, by an external voltage divider network, so that the entire speed range of the motor can be represented by a ±9V feedback signal.

ATTENTION: Connecting a tach which has an output range greater than ±10V directly to the analog input channel can severely damage the adapter board.

The tach signal then must be scaled in the adapter board to determine the proper relationship of output voltage/ motor velocity to base speed in Drive Units. This scaled configuration data must then be linked to Parameter 156 "Tach Velocity."

Many problems relate to the scaling of the tach signals. Below is a procedure for checking the scaling of the analog tach feedback for proper drive operation.

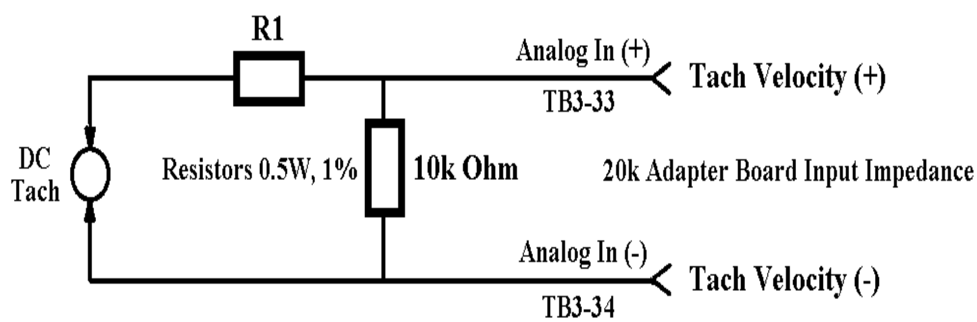
1. Determine the Volts/RPM rating of the tach (refer to tach name plate). Multiply this rating times the absolute maximum speed the motor will be commanded to accelerate to. This value should also be programmed in Parameter 607 "Rev Speed Lim" and 608 "Fwd Speed Lim" to assure that the velocity command will be properly clamped.

   Volts/RPM Rating x Max Speed = Max Volts Output

2. The Max Volts output must then be scaled to a level within the +10V analog input channel range. This can be accomplished by using a voltage divider network external to the drive. The voltage divider will take the Max Volts output and scale it to a maximum 9V input. This allows for protection against 10% overshoot.

Figure 25 uses a 10k ohm resistor across the input channel. R1 represents the dropping resistor for the scaling network. To determine the value of R1 use the equation that follows:

Figure 25
Scaling Circuit



$$\frac{\text{(Max Volts Output) x 6666}}{\text{9V}} - 6666 = \text{R1}$$

3. The analog input channel on the adapter board must now be scaled to represent an accurate velocity feedback signal. First determine the analog input signal for base speed. Parameter numbers are given in ( ) where applicable.

$$\frac{\text{Base Motor Speed (606) x 9V}}{\text{Max Speed}} = \text{Base Speed Input}$$

4. The input voltage at base speed is then converted to Raw Adapter Units according to the following equation.

$$\frac{\text{Base Speed Input x 2048}}{\text{Raw Adapter Units}} = \text{Raw Adapter Units}$$

5. The Raw Adapter Units are then used to determine the correct scaling parameter value according to the equation below.

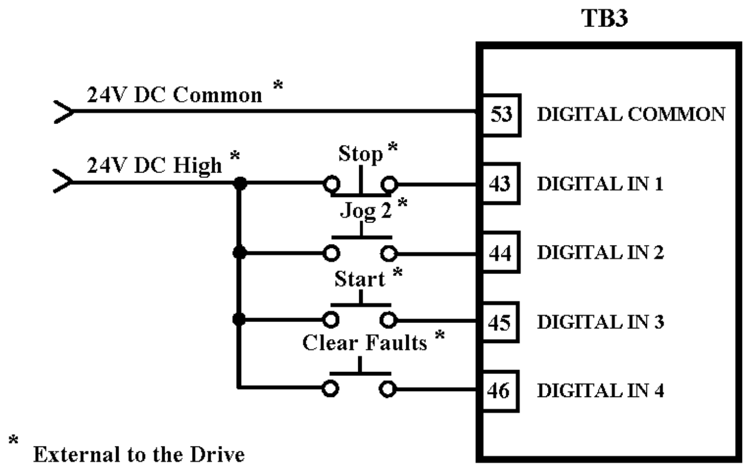
$$\frac{4096}{\text{Raw Adapter Units}} = \text{Scaling Parameter Value}$$

6. The Scaling Parameter Value should then be entered into the associated analog input scaling setup parameter. This procedure will be correct to within 5%. Verify that the scaling is correct by measuring the actual motor velocity with a hand tachometer. Fine tune the scaling by adjusting the appropriate value to minimize any error.

7. Any drift at zero speed can be minimized by adjusting the offset parameter associated with the channel in use.

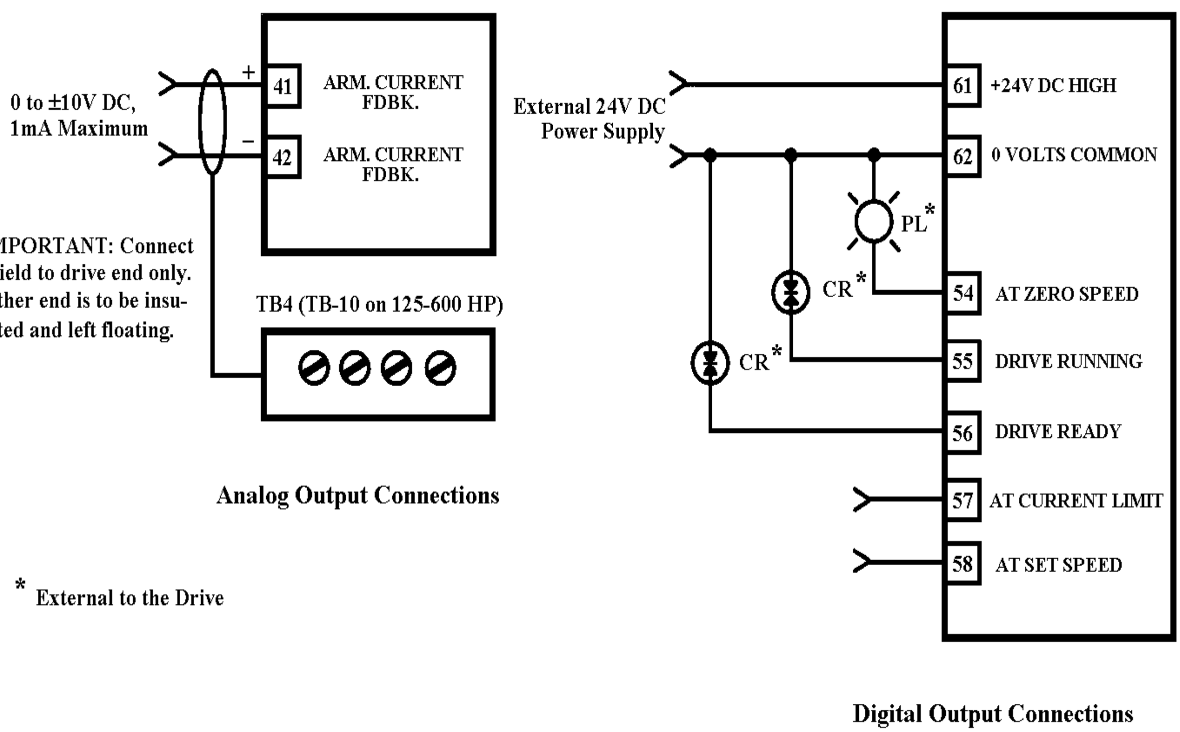
Digital Input - Figure 26 shows a typical digital input connection.

Figure 26
Typical 24V DC Digital Input Connections using External Power Supply



Analog/Digital Output
Figure 27 shows typical analog and digital output connections.

Figure 27
Typical Output Connections



Node Adapter Board
The Node Adapter Board is connected to Microbus Port B and is not preconfigured. Refer to the Node Adapter manual for configuration and installation information.

Multi-Communication Adapter Board
The Multi-Communication Board is not preconfigured. Refer to the Multi-Communication Adapter manual for configuration and installation information.

Armature Current Ratings

The following tables provide nameplate data information to help you size wires during installation.

Table P
230VAC Input - Armature Current Ratings

	ARMATURE				FIELD			
	AC Input		DC Output		AC Input		DC Output	
Power Output	Volts	Max A	Volts	Max A	Volts	Max A	Volts	Max A
.75KW/1HP	230	3.85	240	4.7	230	10	150	10
1.2KW/1.5HP	230	5.4	240	6.6	230	10	150	10
1.5KW/2HP	230	7.0	240	8.5	230	10	150	10
2.2KW/3HP	230	10.0	240	12.2	230	10	150	10
3.7KW/5HP	230	16.4	240	20	230	10	150	10
5.6KW/7.5HP	230	23.7	240	29	230	10	150	10
7.5KW/10HP	230	31.0	240	38	230	10	150	10
11.2KW/15HP	230	45.0	240	55	230	10	150	10
15KW/20HP	230	65.3	240	80	230	10	150	10
18.7KW/25HP	230	80.0	240	98	230	10	150	10
22.4KW/30HP	230	89.8	240	110	230	10	150	10
29.9KW/40HP	230	135.3	240	140	230	20	150	10
37.3KW/50HP	230	168.0	240	180	230	20	150	20
44.8KW/60HP	230	188.0	240	210	230	20	150	20
56KW/75HP	230	233.3	240	260	230	20	150	20
74.6KW/100HP	230	302.7	240	345	230	20	150	20
93.3KW/125HP	203	416	240	472	230	40	150	20
112KW/150HP	230	497	240	564	230	40	150	40
149.2KW/200HP	230	591	240	670	230	40	150	40
186.5KW/250HP	230	810	240	918	230	40	150	40
223.8KW/300HP	230	864	240	980	230	40	150	40

Table Q.
460VAC Input-Armature Current Ratings

	ARMATURE				FIELD			
	AC Input		DC Output		AC Input		DC Output	
Power Output	Volts	Max A	Volts	Max A	Volts	Max A	Volts	Max A
1.5KW/2HP	380/415/460	3.35	400/400/500	4.1	380/415/460	10	250/270/300	10
2.24KW/3HP	380/415/460	4.82	400/400/500	5.9	380/415/460	10	250/270/300	10
3.75KW5HP	380/415/460	7.84	400/400/500	9.6	380/415/460	10	250/270/300	10
5.6KW/7.5HP	380/415/460	11.35	400/400/500	13.9	380/415/460	10	250/270/300	10
7.5KW/l0HP	380/415/460	14.95	400/400/500	18.3	380/415/460	10	250/270/300	10
11.2KW/15HP	380/415/460	22.9	400/400/500	28	380/415/460	10	250/270/300	10
15KW/20HP	380/415/460	29.4	400/400/500	36	380/415/460	10	250/270/300	10
18.7KW25HP	380/415/460	36.8	400/400/500	45	380/415/460	10	250/270/300	10
22.4KW/30HP	380/415/460	41.7	400/400/500	51	380/415/460	10	250/270/300	10
29.9KW/40HP	380/415/460	54.9	400/400/500	67.2	380/415/460	10	250/270/300	10
373KW/50HP	380/415/460	71.9	400/400/500	88	380/415/460	10	250/270/300	10
44.8KW/60HP	380/415/460	86.6	400/400/500	106	380/415/460	10	250/270/300	10
56KW/75HP	380/415/460	135.5	400/400/500	140	380/415/460	20	250/270/300	20
74.6KW/l00HP	380/415/460	168.0	400/400/500	180	380/415/460	20	250/270/300	20
400/400/500	380/415/460	188.0	400/400/500	260	380/415/460	20	250/270/300	20
400/400/500	380/415/460	233.3	400/400/500	260	380/415/460	20	250/270/300	20
400/400/500	380/415/460	302.7	400/400/500	345	380/415/460	20	250/270/300	20
186.5KW/250HP	380/415/460	390	400/400/500	442	380/415/460	40	250/270/300	40
223.8KW/300HP	380/415/460	466	400/400/500	529	380/415/460	40	250/270/300	40
298.4KW/400HP	380/415/460	591	400/400/500	670	380/415/460	40	250/270/300	40
373KW/500HP	380/415/460	805	400/400/500	913	380/415/460	40	250/270/300	40
448KW/600HP	380/415/460	864	400/400/500	980	380/415/460	40	250/270/300	40