



APPLICATION NOTE

THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

Product Family: GS20 VFD

Number: AN-GS-020

Subject: Master /follower conveyors

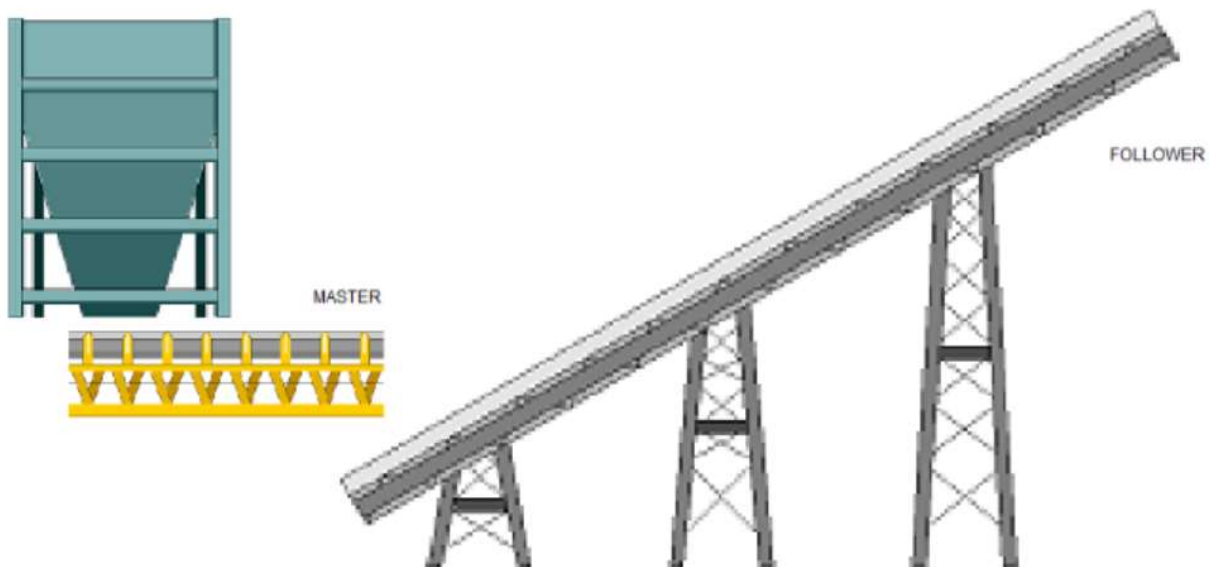
Date Issued: Dec-8-2020

Revision: 2 (for final review)

A client intends to control the speed of 2 belt conveyors in the range of 10 to 100% of the speed using a potentiometer and pushbuttons installed in a console in the control station. This is considered the remote control.

Additionally, for maintenance purposes, he wants to use the VFD keypad. It will also exist a 2-position selector switch in this console for selection of local operation for maintenance.

These conveyors are driven by induction motors of 5 HP, 1150 rpm type MTCP2-005-3BD12 using a GS23-45P0 VFD and other of 15 HP, 1750 rpm, type MTCP2-015-3BD18C using a GS23-4015 VFD and he wants a master and a follower, as shown in the figure below:



Both conveyors are engineered to move the same amount of material when in sync. The mechanical part of this example project will not be discussed in this document

In the next pages are shown:

- a) An electrical diagram showing the wiring and
- b) The parameter settings.

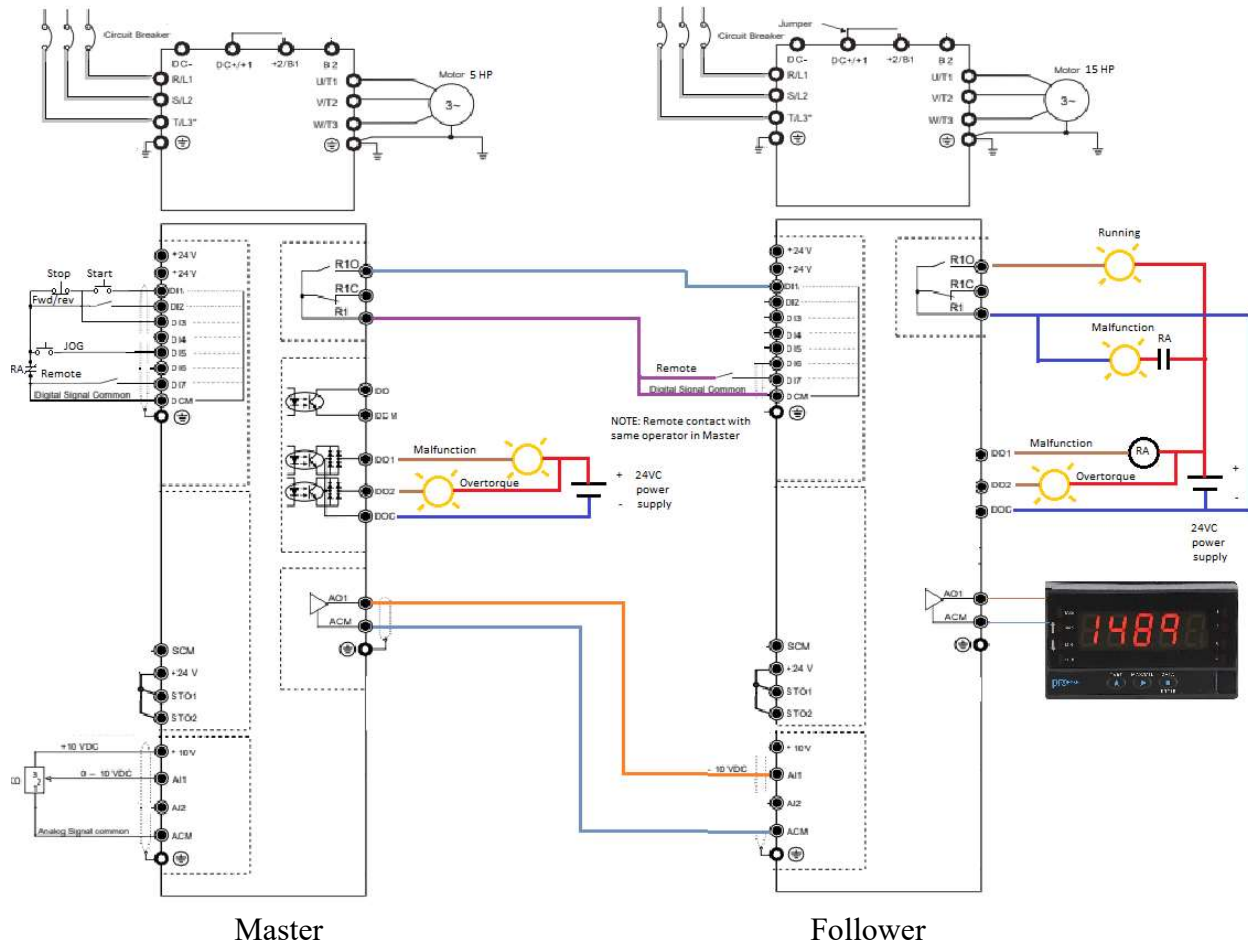


THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

Installation instructions and selection of enclosure & cooling are not discussed in this application note.

Wiring shown in the diagram below



External control equipment is shown in the list below:

Part #	Description	Purpose
GCX1102	Pushbutton , momentary, 1 N.O. contact, green operator	Start master
GCX1101	Pushbutton , momentary, 1 N.C. contact, red operator	Stop master
GCX1100	Pushbutton , momentary, 1 N.O. contact, black operator	JOG
GCX1300	2 pos selector switch, 1 N.O contact, maintained	Sel. local-remote
ECX2300-5K	5 Kohm potentiometer	Motor speed control
ECX2640	Legend plate for item above	
GCX1232-24L	LED pilot light 24VDC , 22 mm, green	To indicate running
GCX1231-24L	LED pilot light 24VDC , 22 mm, red	To indicate a Fault
GCX1233-24L	LED pilot light 24VDC , 22 mm, yellow	To indicate over-torque
781-1C-24D	Relay RA	
781-1C-SKT	Socket for relay above	



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

DPM3-AT-A-L Digital display panel

To indicate rpm

After wiring you can proceed to set the parameters.

Before programming, reset the drives to default condition with P00-02 set to 10, with the keypad

Parameter settings for master

Parameter	Description	Value
P00-11	Speed control mode	0
	<i>Control mode is Volt/Hz</i>	
P00-16	Load selection	1
	<i>Constant Torque (CT): overload rated output current 200% in 3 seconds. (150%,1 minute)</i>	
P00-20	Frequency reference source in REMOTE	2
	<i>External analog input 10 Volt</i>	
P00-21	Operation command source in REMOTE	1
	<i>Start/stop with terminals</i>	
P00-29	Local/remote selection	4
	<i>When switching between local and remote, the drive runs with LOCAL settings when switched to Local and runs with REMOTE settings when switched to Remote for frequency and operating status.</i>	
P00-30	Freq command in LOCAL	7
	<i>Using the keypad potentiometer</i>	
P00-31	start/stop command source	0
	<i>Start/stop using the keypad pushbuttons</i>	
P01-00	Maximum operation frequency	60
	<i>This is the upper limit of the VFD operation frequency</i>	
P01-01	Motor base frequency	60
	<i>Motor nameplate frequency</i>	
P01-02	Motor nameplate voltage	460
	<i>Motor nameplate Voltage</i>	
P02-00	Wiring for start	3
	<i>Three-wire operation method</i>	
P02-01	DI1 function	0
	<i>Three-wire operation method</i>	
P02-02	DI2 function	0
	<i>Three-wire operation method</i>	
P02-03	DI3 function	0
	<i>Three-wire operation method</i>	
P02-04	DI4	56
	<i>No function</i>	
P02-05	DI5 JOG	6
	<i>Jog external pushbutton input</i>	
P02-06	DI6 function	0
	<i>No function</i>	



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

P02-07	DI7 function	0
<i>When this input is ON, the condition is Remote</i>		
P02-13	R1 function	1
<i>Output indicating the VFD is running</i>		
P02-16	DO1 function	11
<i>Output indicating the VFD got a malfunction</i>		
P02-17	DO2 function	7
<i>Output indicating the VFD got an overtorque (See P06.06 to P6-08)</i>		
P3-00	AI1 analog input selection	0
<i>AI1 do not have any function</i>		
P3-01	AI2 analog input selection	1
<i>AI2 has the function of frequency reference. Please set the switch AI1 to 0-10 Volt</i>		
P03-20	A01 function	0
<i>Function as output frequency to be the frequency reference for the follower</i>		
P03-28	AI1 input selection	0
<i>Signal selected as unipolar 0-10 VDC.</i>		
P03-39	VR input selection	1
<i>Signal selected as unipolar 0-10 VDC for use with the potentiometer.</i>		
P03-41	VR positive	0
<i>No bias in the potentiometer</i>		
P05-01	Rated current of Motor (Nameplate data)	80.7 %
<i>Motor FLA 7.27; VFD 9A</i>		
P05-03	Rated motor speed in rpm	1175 rpm
<i>From motor nameplate</i>		
P6-01	Overvoltage stall prevention	0
<i>Disabled function</i>		
P06-06	Overtorque selection	1
<i>Continue operation after over-torque detection during constant speed operation</i>		
P06-07	Over-torque level	81 %
<i>100% is the drive current (9A)</i>		
P06-08	Over-torque detection time	1 s
<i>Time to detect over-torque</i>		
P06-13	Thermal relay selection	1
<i>Motor with shaft cooling fan</i>		

Parameter settings for follower

Parameter	Description	Value
P00-11	Speed control mode	0
<i>Control mode is Volt/Hz</i>		
P00-16	Load selection	1
<i>Constant Torque (CT): overload rated output current 200% in 3 seconds. (150%,1 minute)</i>		
P00-20	Frequency reference source in REMOTE	2
<i>External analog input 10 Volt</i>		
P00-21	Operation command source in REMOTE	1



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

Start/stop with terminals

Parameter	Description	Value
P00-29	Local/remote selection	4
	<i>When switching between local and remote, the drive runs with LOCAL settings when switched to Local and runs with REMOTE settings when switched to Remote for frequency and operating status.</i>	
P00-30	Freq command in LOCAL	7
	<i>Using the keypad potentiometer</i>	
P00-31	start/stop command source	0
	<i>Start/stop using the keypad pushbuttons</i>	
P01-00	Maximum operation frequency	60
	<i>This is the upper limit of the VFD operation frequency</i>	
P01-01	Motor base frequency	60
	<i>Motor nameplate frequency</i>	
P01-02	Motor nameplate voltage	460
	<i>Motor nameplate Voltage</i>	
P02-00	Wiring for start	1
	<i>Two-wire operation method</i>	
P02-01	DI1 function	0
	<i>Three-wire operation method</i>	
P02-02	DI2 function	0
	<i>Three-wire operation method</i>	
P02-03	DI3 function	0
	<i>Three-wire operation method</i>	
P02-04	DI4 Local/remote selection	56
	<i>When this input is ON, the condition is Remote</i>	
P02-05	DI5 JOG	6
	<i>Jog external pushbutton input</i>	
P02-06	DI6 function	0
	<i>No function</i>	
P02-07	DI7 function	0
	<i>No function</i>	
P02-13	R1 function	1
	<i>Output indicating the VFD is running</i>	
P02-16	DO1 function	11
	<i>Output indicating the VFD got a malfunction; This stops the master too in case of failure</i>	
P02-17	DO2 function	7
	<i>Output indicating the VFD got an over-torque (See P06.06 to P6-08)</i>	
P3-00	AI1 analog input selection	0
	<i>AI1 do not have any function</i>	
P3-01	AI2 analog input selection	1
	<i>AI2 has the function of frequency reference. Please set the switch AI1 to 0-10 Volt</i>	
P03-20	A01 function	0



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

Function as output frequency to be the frequency reference for the follower

P03-28	All input selection	0
--------	---------------------	---

Signal selected as unipolar 0-10 VDC.

P03-39	VR input selection	1
--------	--------------------	---

Signal selected as unipolar 0-10 VDC for use with the potentiometer.

P03-41	VR positive	0
--------	-------------	---

No bias in the potentiometer

P05-01	Rated current of Motor (Nameplate data)	72.4%
--------	---	-------

Motor FLA 18.1A; VFD 25.0A

P05-03	Rated motor speed in rpm	1765 rpm
--------	--------------------------	----------

From motor nameplate

P6-01	Overvoltage stall prevention	0
-------	------------------------------	---

Disabled function

P06-06	Overtorque selection	1
--------	----------------------	---

Continue operation after over-torque detection during constant speed operation

P06-07	Overtorque level	72.4%
--------	------------------	-------

100% is the drive current (25.0 A)

P06-08	Overtorque detection time	1 s
--------	---------------------------	-----

Time to detect over-torque

P06-13	Thermal relay selection	1
--------	-------------------------	---

Motor with shaft cooling fan

When in Local the control of the output frequency is done with the keypad potentiometer as well as the keypad start and stop pushbuttons

Technical Assistance: If you have questions regarding this Application Note, please contact us at 770-844-4200 for further assistance.