Yaskawa Goodwin Programming Notes

Original Notes on Goodwin Electronics Inverter Setup

Contents

Stuga Software Inverter and DWEZ interaction

Latest Software Version Stuga Test 003.ydwz 26/7/18
Latest Parameter Version StugaReleaseV1_5.YDWGProj 19/9/18
StugaReleaseV1_5Parameters.pdf 19/9/18
Overview
Use inverter built in PLC function to decode motor selections, use inverter inbuilt feature to control forward movement and motor 1/2 selection. DWEZ with use relay output to activate motor 1/2 selection and to monitor single 300Hz current limit. The DWEZ currently limit alarm will occur if current is greater than Percentage about when output speed is greater than percentage amount.
Motor 1 = 50Hz S8 Inactive for Motor 1 and 50Hz
Motor 2 = 300Hz S8 Active for Motor 2 and 300Hz
Inputs S1-S2 select motor frequency by controlling M3-M4 output
Inputs S3-S4 select motor single or dual, only 300Hz can be dual
Input S8 also selects between 50Hz and 300Hz speed selection and Motor 1/2
Output M3-M4 which feeds S8 selects Motor 1(50Hz) when inactive or Motor 2(300Mz) when active, derived when both S1 and S2 are inactive and driven from DWEZ program.
Output M5-M6 is to indicate when Motor 2 is selected, for monitoring purposes only.
IO Required from spec PRJ-133 Specification for Spindle Motor Protection Improvement v4.pdf
Inputs FWD Inverter Forward accel to motor speed on high, decel to zero on low
MI1 50Hz Spindle Select
MI2 50Hz Spindle Select
MI3 Single Motor On
MI4 Second Motor On
RST Reset Fault
RTO Resistor Thermal Overload
All inputs are 24v Active
STO Safe Torque Off (linked to Estop circuit). Volts-free contact
Outputs Volts free relays
INVOK Inverter OK MC-MB or M3-M4
0HZ Inverter at Zero Speed M1-M2
GA700 electrical connections for STO will be independent of Inputs and output and must be Volts free contacts, use a relay to operation for active signal if required.
STO Safe Torque Off (linked to Estop circuit). Volts-free contact
GA700 parameters should be setup for 2 motor Control, external fault, fwd run operation, fixed frequency operation from keypad?
This will using inputs and outputs
Inputs
S1 DWEZ set to 90, see below

S2 DWEZ set to 91, see below
S3 DWEZ set to 92, see below
S4 DWEZ set to 93, see below
S5 FWD Inverter Forward Accel to motor speed on high, Decel to zero on low
S6 RST Reset Fault
S7 RTO Resistor Thermal Overload
S8 Motor 2 Selection
Outputs Volts free relays
MC-MB INVOK Inverter OK
M1-M2 0HZ Inverter at Zero Speed
M3-M4 DWEZ DO2 output wired to S8 Motor 2 Selection
M5-M6 Motor 2 Selection Confirmed Output
Motor 1 1x 50Hz
Motor 2 2x 300Hz NB set to higher current demand, for two motors
This is as tested
DWEZ should be set up for the following functions
S1 MI1 50Hz Spindle Select
S2 MI2 50Hz Spindle Select
S3 MI3 Single Motor On
S4 MI4 Second Motor On

DWEZ PLC Functions

IF S1(MI1)=0 && S2(MI2)=0 THEN 300Hz ELSE 50Hz motor NOR
IF S3(MI3)=1 && S4(MI4)=1 THEN Dual motor control ELSE Single motor control AND
IF 50Hz selected and Dual motor selected then error, inhibit operation
IF 300Hz and Single motor then monitor current and error if current exceeds limit
300Hz set as Motor 2 option, use VMF DI1 for this purpose
DWEZ Fault 1 Dual 50Hz motor selected, not allowed DWFL
This means 50Hz Dual motor inhibits forward operation.
DWEZ Fault 2 Single 300Hz over current, as defined in Q1-01 DWF2
In Single 300Hz motor the inverter is set to Dual current level (4A) in parameters and DWEZ monitors lower value.
Use Q1-01 to set percentage of maximum current allow before fault triggered, current setting is 75% = Approx. 3A (for 300Hz motor 4A is max current setting 2x 2A)
Use Q1-02 to set percentage of maximum speed below which current limit is set to higher inverter built in value, current setting 20% = 60Hz
Truth Tables

S1(MI1)	S2(MI2)	Motor Frequency
0	0	300Hz <NOR>
1	0	50Hz <OR>
0	1	50Hz <OR>
1	1	50Hz <OR>

S3(MI3)	S4(MI4)	Single/Dual Motor
0	0	Single <NAND>
1	0	Single <NAND>
0	1	Single <NAND>
1	1	Dual, 300Hz motors Only <AND>

Parameters

b1-01 Frequency Reference Selection 1 0 Keypad
b2-02 DC injection 0%
b2-04 DC Injection Braking Time 0.0s
C1-01 Acceleration Time 1 0.1 sec Motor 1 50Hz
C1-02 Deceleration Time 1 0.3 sec
C1-05 Acceleration Time 3 0.1 sec Motor 2 300Hz
C1-06 Deceleration Time 3 0.3 sec
d1-01 Reference 1 50.00 Hz when S8 inactive Motor 1 50Hz
d1-02 Reference 2 300.00 Hz when S8 active Motor 2 300Hz
E1-01 Input AC Supply Voltage 415 VAC
E1-04 Maximum Output Frequency 50.0 Hz

E1-05 Maximum Output Voltage 373.5 VAC
E1-06 Base Frequency 50.0 Hz
E1-08 Mid Point A Voltage 4.5 VAC
E1-10 Minimum Output Voltage 0.9 VAC
E2-01 Motor Rated Current (FLA) 1.72 A 50Hz
E2-02 Motor Rated Slip 13.727 Hz
E2-03 Motor No-Load Current 0.85 A
E2-04 Motor Pole Count 2
E2-05 Motor Line-to-Line Resistance 19.4 Ω
E2-06 Motor Leakage Inductance 40.0 %
E2-07 Motor Saturation Coefficient 1 0.47
E2-08 Motor Saturation Coefficient 2 0.72
E2-11 Motor Rated Power (kW) 0.75 kW
E3-04 Maximum Output Frequency 300.0 Hz
E3-06 Base Frequency 300.0 Hz
E4-01 Motor 2 Rated Current 4.00 A 300Hz
E4-02 Motor 2 Rated Slip 13.727 Hz
E4-03 Motor 2 Rated No-Load Current 0.69 A
E4-04 Motor 2 Motor Poles 2
E4-05 Motor 2 Line-to-Line Resistance 6 Ω
E4-06 Motor 2 Leakage Inductance 40.0 %
E4-11 Motor 2 Rated Power 0.75 kW

Inputs

H1-01 Terminal S1 Function Selection 0090 DWEZ DI1 DWEZ
H1-02 Terminal S2 Function Selection 0091 DWEZ DI2 DWEZ
H1-03 Terminal S3 Function Selection 0092 DWEZ DI3 DWEZ
H1-04 Terminal S4 Function Selection 0093 DWEZ DI4 DWEZ
H1-05 Terminal S5 Function Selection 0040 Forward RUN DEFAULT
H1-06 Terminal S6 Function Selection 0014 Fault Reset
H1-07 Terminal S7 Function Selection 0024 External Fault
H1-08 Terminal S8 Function Selection 0016 Motor 2 Selection when active
H1-28 Terminal S8 Function Select 2 0003 Multi-Step Speed Reference 1/2

Outputs

H2-01 Term M1-M2 Function Selection 0001 Zero Speed
H2-02 Term M3-M4 Function Selection 0091 DWEZ D02
H2-03 Term M5-M6 Function Selection 001C Motor 2 Selected
H3-02 Terminal A1 Function Selection 0F Through Mode
H3-06 Terminal A3 Function Selection 0F Through Mode
H3-10 Terminal A2 Function Selection 0F Through Mode
L3-04 Stall Prevention during Decel 0 Disabled
O1-39 initial screen OFF 0
O2-01 Disable Lo/Re 0

DWEZ

Q1-01 300Hz single motor max current as percentage of Motor 2 Rated (4A)
Current Setting 75%
Q1-02 300Hz single motor speed above which to monitor current as percentage of Motor 2 Speed (300Hz)
Current Setting 75%