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Find the *Yokogawa UM1LG3-505B-6AA-1TB-N* at our website: ***Click HERE***

General Specifications

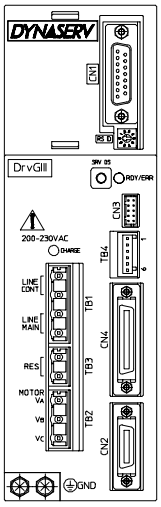
Intelligent Drive
for DYNASERV and LINEARSERV
DrvGIII

GS 71M01D03-01E

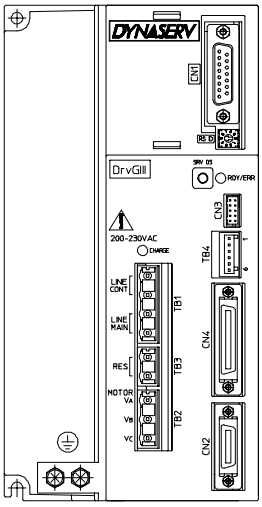
Product Overview

DrvGIII is the latest intelligent drive used with Yokogawa's direct drive motors. As the successor to the SD, SR, and TM drives, the DrvGIII is designed to improve motor controllability and operation.

- 500W Class -



- 2kW Class -



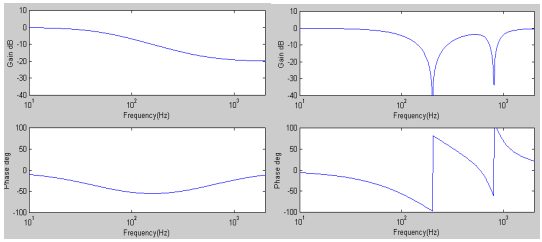
Controller Enhancements

- The phase delay in the velocity control loop was reduced, and the velocity control bandwidth has been improved at higher frequencies.
- In addition to a variety of feed forward functions, the drive's following capabilities were improved, and the settling time has been reduced even further.
- Various filters, to compensate for mechanical resonance, are available.

Operational Enhancements

- Simple positioning operations can be easily executed using a single motion control table entry configured through software. In addition, more complicated operations, such as sequential execution of entries and branching to any entry in the table, can also be achieved.
- A Windows based utility software allows for easy drive configuration
- A detachable operation display panel (optional) makes it easier to check drive status and make drive adjustments.

- Filter -



- Operations by motion control table -

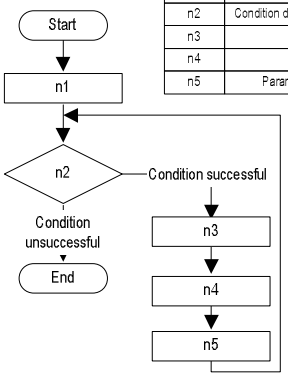


Table No.	Motion Detail	Cont. after execution	Next Table
n1	Parameter input (counter clear)	1 (cont.)	n2
n2	Condition divergence (n3 if condition successful)	0 (stop)	(N/A)
n3	Incremental positioning	1 (cont.)	n4
n4	Dwell	1 (cont.)	n5
n5	Parameter input (Counter increment)	1 (cont.)	n2

- Windows Software -



- Operation Display Pendant (Optional) -



- Operation Display Panel (Optional) -



YOKOGAWA

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Features

[Performance]

High Resolution

Up to 4,096,000 pulses/rev, depending on motor/drive combination (command and monitor pulse, max. setting value for combination of DYNASERV UD1AG3 driver + DM1A motor).

Controllability

Equipped with an I-PD control system, making it easier to compensate for resonance. This control system has an advantage at the higher frequencies of the control loop bandwidth where direct drives tend to be influenced by mechanical resonance. Three types of feed forward functions (position, velocity, and acceleration) assist in improving the drive's following capability and shortening the motor's settling time. Common PID control is also included.

Multiple Filter Functions

- Notch filter to compensate for a resonance frequency (2 channels)
- Phase delay compensation filter to compensate for the entire high frequency bandwidth region
- Velocity feedback filter to eliminate high frequency noise
- Velocity command filter to smooth acceleration

Down Sized (Smaller Footprint)

Both size and weight are half of the SD/SR drive and two-thirds of the TM drive.

[Safety and Standard]

Reduction of Unexpected Move at Power Failure

Servo deceleration starts immediately upon detecting a power failure. Motor stops rapidly by the dynamic brake (optional) even in servo-off status.

Regeneration Power Monitoring

The drive constantly monitors the regeneration circuit and the amount of regeneration power. A designated error signal output activates if an abnormal state is detected.

UL, CE (Conformed Standard)

EN50178, EN55011, EN61800-3, UL508C

Servo Disable Switch

The servo disable switch, located on the front of the drive, allows the user to disable the servo drive while pressed. In the event motion becomes unstable, this will immediately de-energize the motor.

[Operation]

Operation Display Panel (Optional)

This display allows the user to check the status of the drive and adjust parameters without having to connect to a computer. The display can be connected and removed while the drive is powered and operating. Because of this feature, one display can be used with multiple drives, minimizing the number of displays needed by the user.

Operation Display Pendant (Optional)

With a twenty key keypad (including ten numeric keys and eight function keys), the Pendant is a more user-friendly interface than the Operation Display Panel. In addition, 16 unique drive configurations may be stored on the Pendant, lending itself very useful for system maintenance.

Windows Utility Software

The Windows-based software was designed for ease of use. Through a menu driven interface, the user is allowed to configure the drive, set up motion tables, and tune the motor performance. With a fully functional four channel oscilloscope, users can monitor nearly every system parameter. A variety of trigger functions, cursors, and measurement functions are also available. Oscilloscope waveforms can be stored in CSV format, making it easy to export the data to a Microsoft Excel application.

[Ease to Use]

Auto-Tuning Function

With the load attached to the motor, small incremental moves are made and the drive automatically estimates the load's mass and inertia. This decreases the time needed to tune the system, and results in a rigidly tuned system.

Built-in Positioning Function

The drive is able to execute various positioning operations, such as M-Functions, homing, dwells, parameter changes, and coordinate operations by simply selecting and activating numbered entries in the table. There are a maximum of 64 numbered entries available in the table. Execution sequence of the numbered entries can be controlled through sequential calls from one table to the next and branching calls directly to other entries. Complicated motion profiles can be created using a combination of numbered entries.

Position Command Signal, Position Feedback Signal, and m:n Scaling Function

The position command signal (pulses) is selectable from the following three types: PLS-SIGN (STEP-DIR), UP-DOWN, or A-B encoder. The position feedback signal (output) is selectable to be either UP-DOWN or A-B encoder. The position command signal and actual commanded position value in the drive are converted to internal drive command pulses by the m:n scaling factor, and output as the actual position on the position feedback signal.

User configurable I/O

All inputs and outputs are completely configurable. Therefore, the user can optimize the inputs and outputs functionality for their system. Both the function and the logic level can be chosen for each I/O point.

RS232C / 485 Interface

The RS232C interface allows for easy connection and configuration of the drive using the Windows Utility Software. In addition, RS485 is also available for multi-channel (up to 10 units) communication between drives.

Screw-less Terminal Strip Connections

Wiring to the drive's AC power supply leads, motor power leads, and Regen Resistor are made easier by the screw-less terminal strip connectors on the front of the drive.

Error/Alarm History Log

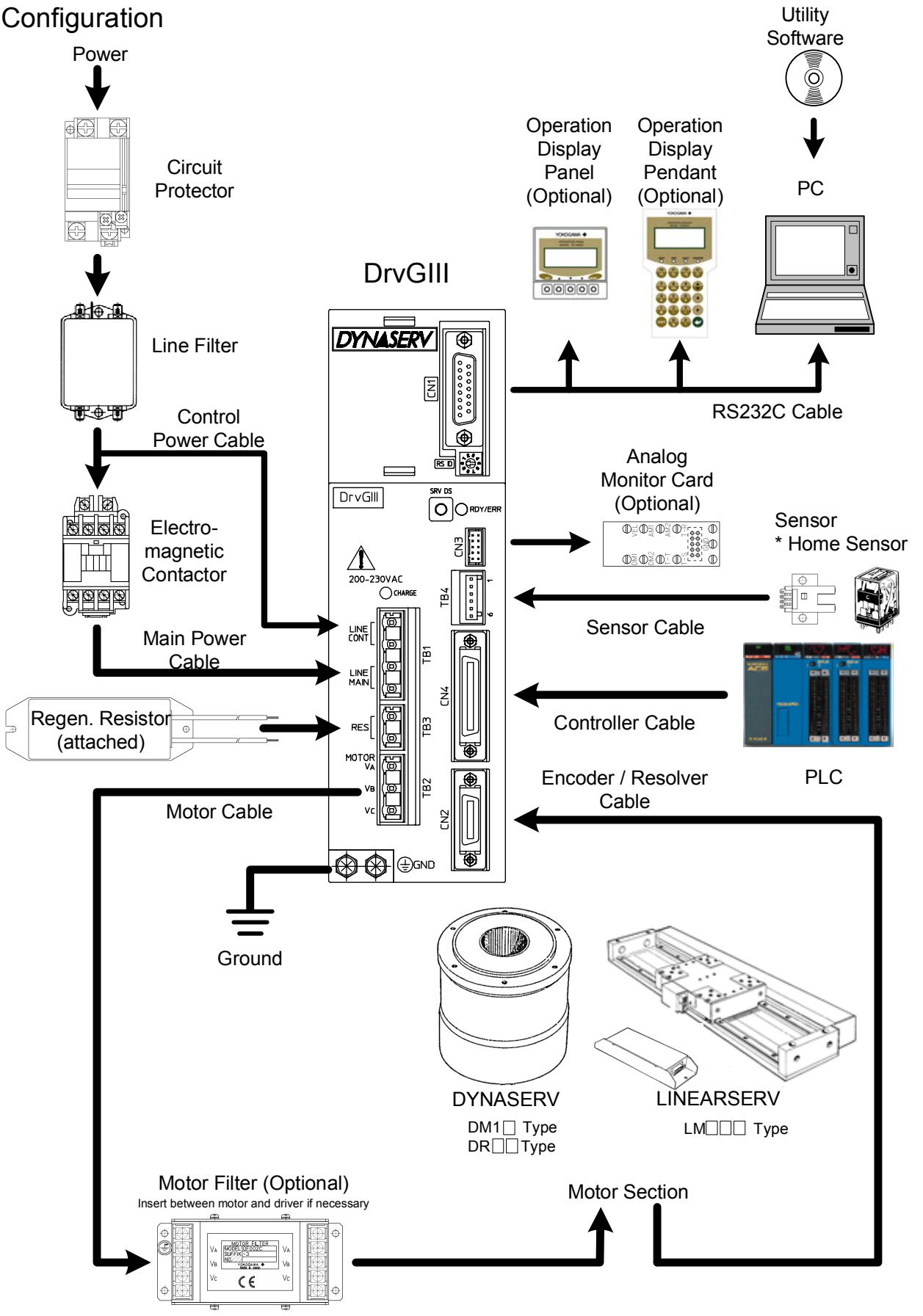
The most recent 16 error or alarm instances are recorded in a history log. Because the log remains updated, even after a power cycle, it is a useful tool in evaluating and verifying problems with the drive.

Motor-less Operation

The Windows Utility Software allows the user to simulate motion and drive logic (e.g. I/O) without a motor connected. This can be very useful for start-up and controller debugging purposes.

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Configuration



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Specifications

			500W Class	2kW Class
Basic Specifications	Power	Power Supply	100~115VAC / 200~230VAC +10% -15% 50 / 60Hz Single Phase	
		Control	100~115VAC / 200~230VAC +10% -15% 50 / 60Hz Single Phase	
		Max. Consumption	1.3kVA	3.4kVA
	Environment	Temperature	0~+50℃ (Operation) / -20~+85℃ (Storage)	
		Humidity	20~90%RH No condensing (Operation and Storage)	
		Atmosphere	No corrosive gases, dust-free atmosphere Do not locations exceeding 1000m above the sea level	
	Construction	Installation	Wall-mount	
		Fan	N/A	Built-in DC Fan
		Regen. Resistor	External	Built-in
	External Dimensions		60 W x 195 H x 150 D (mm)	100 W x 195 H x 200 D (mm)
	Weight		1.2kg	2.5kg
	Conformed Standard		Low voltage (declaration) EN50178, EMC (declaration) EN55011 class A group 1, EN61800-3	
			UL508C	
	Resistance and Pressure		Insulation resistance : 10MΩ or more (DC500V), Insulation pessure : 1500VAC 1min	
	Encoder Resolution Value inside ( ) is factory default value for command and monitor pulses		DYNASERV UD1AG3 : 4,096,000 pulse/rev (1,024,000 pulse/rev) UD1BG3 : 2,621,440 pulse/rev (655,360 pulse/rev) UD1CG3 : 2,621,440 pulse/rev (655,360 pulse/rev) UR1AG3 : 1,638,400 pulse/rev (819,200 pulse/rev) UR1BG3 : 1,015,808 pulse/rev (507,904 pulse/rev) UR1EG3 : 1,228,800 pulse/rev (614,400 pulse/rev) UR5BG3 : 557,056 pulse/rev (278,528 pulse/rev) UR5CG3 : 425,984 pulse/rev (212,992 pulse/rev) UR5EG3 : 638,976 pulse/rev (319,488 pulse/rev)	
			LINEARSERV UM1LG3-[ ][ ][ ]B : 0.5 µm (1.0 µm) UM1LG3-[ ][ ][ ]C : 0.25 µm (0.5 µm) UM1LG3-[ ][ ][ ]E : 0.05 µm (0.1 µm)	
PLC interface	Serial Interface (RS232C/RS485)		Communication Start-stop system, Binary communication Communication Speed 38,400bps Multi-Channel (RS485) Max. 10 channels	
	Controller Interface		Pos. Command pulse (input) [PLS-SIGN (STEP-DIR)], [UP-DOWN], [A-B encoder] Pos. Monitor pulse (output) [UP-DOWN], [A-B encoder] Contact I/O 12 for input, 6 for output (with user configurable function) Analog input Velocity, Torque/Thrust command (Select "T" in the model & suffix code) Torque/Thrust limit, Torque/Thrust feed forward	
Mechanical Input Signal			Home sensor, End Of Travel (EOT)	
Control Section	Pos. Control		I-PD control, PID control	
	Vel. Control		Proportional control, PID control	
	Feed Forward		Position, velocity and acceleration	
	Filter		Velocity command, velocity feedback, phase delay compensation and notch (2ch) filters	
Operation Functions			Homing, test, auto-tuning, positioning and jog move functions	
Protection Functions			Encoder error, over voltage, over current, low bus line power voltage, power failure, over load, regen. Error detection, over speed, excessive pos. deviation, hardware EOT and software EOT (for linear coordinate)	
Monitor			Velocity, current instruction, analog (2ch) and digital (2ch)	
Operation / Display			Operation display panel (optional) Operation display pendant (optional) Utility software	
Miscellaneous			Servo deceleration function at power failure (immediate stop) Dynamic brake (Select "-1B" or "-1L" in the model & suffix code)	

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Connectors / Terminals

No.		Item	Connector Part Number	Description	Remark
Power Section	TB1	Power Supply Terminal	Connector : 231-204/026-000 (WAGO)	For main and control power supply	Standard
	TB2	Motor Terminal	Connector : 231-203/026-000 (WAGO)	For motor power cable	Standard
	TB3	Regeneration Resistance Terminal	Connector : 231-202/026-000 (WAGO)	For regeneration resistor	Standard
	GND	GND Terminal	M4 Solder less Terminal	Protection ground	
Control Section	TB4	Sensor Terminal	Connector : 733-106 (WAGO)	For home sensor and ±EOT	Standard
	CN1	Serial Interface Connector (RS232C/485)	Connector : DA-15PF-N (Hirose) Cover : DA-C8-J10-F4-1	For operation display panel, operation display pendant and PC	Optional
	CN2	Encoder / Resolver Connector	Connector : PCR-S20F (Honda) Cover : PCR-LS20LA1	For encoder and resolver cable	Optional
	CN3	Analog Monitor Connector	Monitor card "R7041WC"	For monitors and oscilloscope	Optional
	CN4	Controller Interface Connector	Connector : PCR-S36FS (Honda) Cover : PCR-LS36LA	For connection to PLC	Optional

TB1: Power Supply Terminal

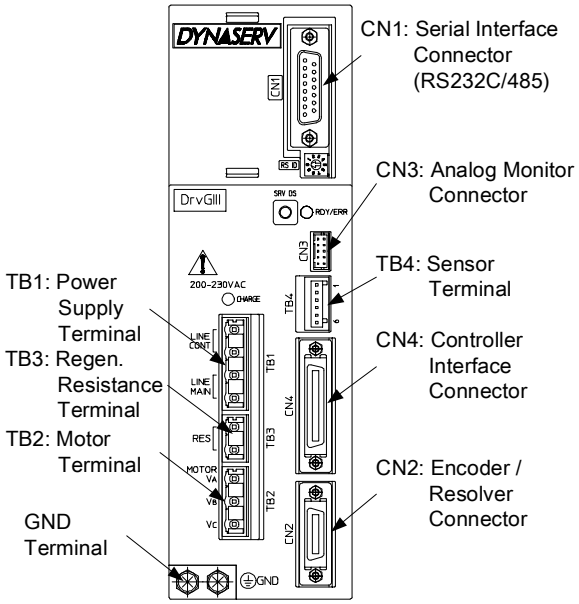
Pin No.	Signal	Definition
1	LINE (CONT) L	AC power input for control circuit
2	LINE (CONT) N	AC power input for control circuit
3	LINE (MAIN) L	AC power input for driving motor
4	LINE (MAIN) N	AC power input for driving motor

TB2: Motor Terminal

Pin No.	Signal	Definition
1	VA	Output of phase A of motor
2	VB	Output of phase B of motor
3	VC	Output of phase C of motor

TB3: Regeneration Resistance Terminal

Pin No.	Signal	Definition
1	RES +	Regeneration resistance +
2	RES -	Regeneration resistance -

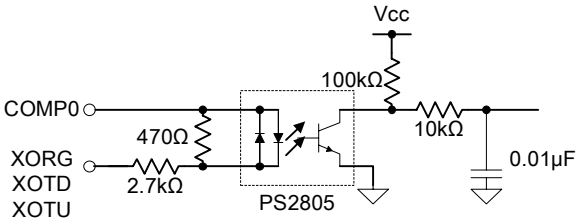


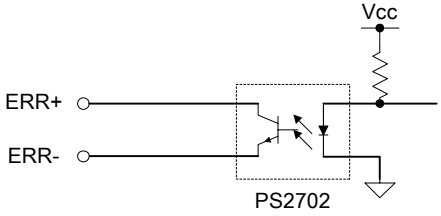
TB4: Sensor Terminal

Pin No.	Signal	Definition
1	COMP0	Sensor power
2	XORG	Home input B-contact
3	XOTD	- EOT input B-contact
4	XOTU	+EOT input B-contact
5	ERR+	Regeneration error output +
6	ERR-	Regeneration error output -

Sensor Input Specifications	
Rated Voltage	12 ~ 24VDC (±10%)
Rated Input Current	4.1mA/point (at 12VDC) 8.5mA/point (at 24VDC)
Input Impedance	3.0kΩ
Operating Voltage (for COMP0)	3.0VDC when power is OFF 9.0VDC when power is ON
Allowable leakage current	To be off at less than 1.0mA

Regeneration Error Output	
Max. Working Voltage	30VDC
Max. Output Current	50mA





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CN1: Serial Interface Connector (RS232C/485)

Pin No.	Signal	Definition
1	FG	Frame GND Signal (Shield)
2	RxD	RxD terminal RS232C single channel communication
3	TxD	TxD terminal RS232C single channel communication
4	A	Rx (+) side terminal RS485 multi-channel communication
5	Y	Tx (+) side terminal RS485 multi-channel communication
6	485SW	Busy condition bit RS485 multi-channel communication
7	TRMP	Terminator terminal RS485 multi-channel communication (short circuit to #14 TRMN)
8	CN1SW	Busy condition bit CN1
9	+5V	+5V power (operation display panel and pendant) Do not connect in RS232C/485 communication
10	SG	Signal GND terminal
11	B	Rx (-) side terminal RS485 multi-channel communication
12	Z	Tx (-) side terminal RS485 multi-channel communication
13	SG	Signal GND terminal
14	TRMN	Terminator terminal RS485 multi-channel communication (short circuit to #7 TRMP)
15	SG	Signal GND terminal

CN2: Encoder / Resolver Connector

Pin No.	Signal			
	Type DM1B-004/006 Type CM1C-004	Type DM (excl. Left hand side models)	Type LM	Type DR
1	+10V	+10V	+10V	-
2	-	-	-	+S0
3	θSIG 0	θSIG 0	SIG 0	-
4	-	ECLK+(10V)	-	-
5	θSIG 1	θSIG 1	SIG 1	-
6	-	-	-	-S0
7	ECLK+(3V)	-	ECLK+(3V)	-
8	-	-	-	-C0
9	-	ZERO+	-	-
10	-	-	FG	+C0
11	-	-	-	+S180
12	GND	GND	GND	-
13	-	ECLK-(10V)	-	-
14	GND	GND	GND	-
15	-	-	-	-S180
16	GND	GND	GND	-
17	-	-	-	-C180
18	ECLK-(3V)	-	ECLK-(3V)	-
19	-	ZERO-	-	-
20	-	-	FG	+C180
Case	Shielding wire	Shielding wire	Shielding wire	FG / Shielding wire

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CN3: Analog Monitor Connector

Pin No.	Signal	Definition
1	VEL	Velocity monitor terminal
2	AMON1	Analog monitor terminal 1 (general purpose monitor 1)
3	AMON2	Analog monitor terminal 2 (general purpose monitor 2)
4	DMON1	Digital monitor terminal 1 (general purpose monitor 1)
5	DMON2	Digital monitor terminal 2 (general purpose monitor 2)
6	T-R	Current command
7	T-T	Reserved
8	T-S	Reserved
9	<Prohibited>	Reserved Do not connect any line.
10	GND	GND terminal for monitor

CN4: Controller Interface Connector

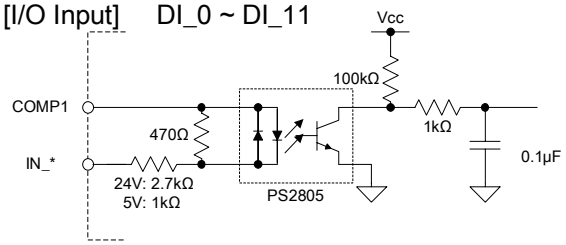
Pin No.	Signal	Definition	
1	COMP1	Interface power +	Input appropriate power according to the interface spec.
2	COMN1	Interface power -	
3	DO_0	I/O output 0	User Configurable Outputs. Defined by assigned signal function. Able to reverse output signal logic.
4	DO_1	I/O output 1	
5	DO_2	I/O output 2	
6	DO_3	I/O output 3	
7	DO_4	I/O output 4	
8	DO_5	I/O output 5	
9	UA_OUT+	Position present pulse 1+	Able to select UP-DOWN or A-B encoder output according to parameter setting.
10	UA_OUT-	Position present pulse 1-	
11	DB_OUT+	Position present pulse 2+	
12	DB_OUT-	Position present pulse 2-	
13	Z_OUT+	Z-pulse +	Outputs Z-pulse of motor.
14	Z_OUT-	Z-pulse -	
15	PUA_IN+	Position command pulse 1+	Able to select PLS-SIGN (STEP-DIR), UP-DOWN, or A-B encoder input according to parameter setting.
16	PUA_IN-	Position command pulse 1-	
17	SDB_IN+	Position command pulse 2+	
18	SDB_IN-	Position command pulse 2-	
19	DI_0	I/O input 0	User Configurable Inputs. Defined by assigned signal function. Able to reverse input signal logic.
20	DI_1	I/O input 1	
21	DI_2	I/O input 2	
22	DI_3	I/O input 3	
23	DI_4	I/O input 4	
24	DI_5	I/O input 5	
25	DI_6	I/O input 6	
26	DI_7	I/O input 7	
27	DI_8	I/O input 8	
28	DI_9	I/O input 9	
29	DI_10	I/O input 10	
30	DI_11	I/O input 11	
31	(NC)		Do not connect any line.
32	(NC)		
33	ASUB_IN+	Analog sub (auxiliary) input +	Able to execute torque / force limit or torque feed forward by enabling through parameter.
34	ASUB_IN-	Analog sub (auxiliary) input -	
35	ACMD_IN+	Analog command input +	Inputs velocity or torque / force command (select "T" in the model & suffix code).
36	ACMD_IN-	Analog command input -	
Shield		Shield treatment terminal	

Default Signal Assignment Settings		
Logic I/O	Definition	Reversed logic
OUT_DRDY	Driver (CPU) ready	Invalid
OUT_SRDY	Servo ready	Invalid
OUT_BUSY	Busy	Invalid
OUT_OVL	Overload signal	Valid
OUT_OVER	Over speed signal	Invalid
OUT_COIN	Coin signal	Invalid

Default Signal Assignment Settings		
Logic I/O	Definition	Reversed logic
IN_ERR_RESET	Error reset	Invalid
IN_SERVO	Servo command	Invalid
IN_START	Drive execution command	Invalid
IN_ABORT	Stops motion & Table Operation	Invalid
IN_I_CODE.0	Code input 0	Invalid
IN_I_CODE.1	Code input 1	Invalid
IN_POSW.0	Coin window select 0	Invalid
IN_POSW.1	Coin window select 1	Invalid
IN_VELFREQ_SEL	Velocity control bandwidth select	Invalid
IN_POSFREQ_SEL	Position control bandwidth select	Invalid
IN_PLS_DIRECT	Pulse priority select	Invalid
IN_POSINT_INH	Pos. control integration prohibited	Invalid

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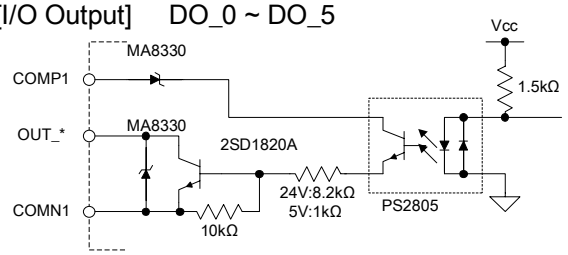
[I/O Input] DI_0 ~ DI_11



Input is in the on-state when the photo-coupler is in the on-state.

Interface Spec	A	B
Rated Voltage	12~24VDC (±10%)	5VDC (±10%)
Rated Input Current	4.1mA / point (at 12VDC) 8.5mA / point (at 24VDC)	4.0mA / point (at 5VDC)
Input Impedance	3.0kΩ	3.0kΩ
Operating Voltage (for COMP0)	3.0VDC when power is OFF 9.0VDC when power is ON	1.0VDC when power is OFF 4.0VDC when power is ON
Allowable leakage current	To be off at less than 1.0mA	

[I/O Output] DO_0 ~ DO_5



Output is in the on-state when the transistor is in the on-state.

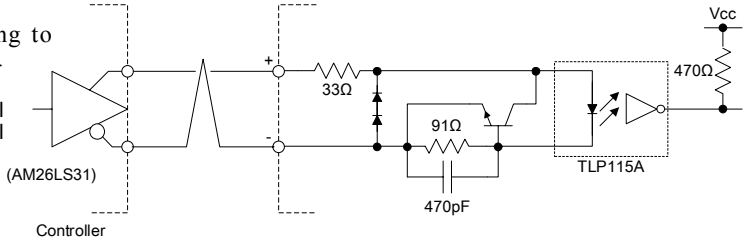
Interface Spec	A	B
Rated Voltage	12~24VDC (±10%)	5VDC (±10%)
Max. load current	0.1A / point, 0.5A / common	
On-state voltage	Less than 0.5VDC	
Off-state leakage current	Less than 0.1mA	

[Position Command Pulse Input] PUA_IN±, SDB_IN±

Differential Input Spec

Connect the differential line driver conforming to RS422A standards, which is equivalent to AM26L31.

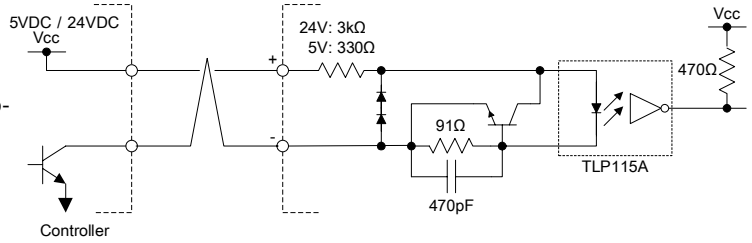
Input is in the on-state when the + terminal becomes a higher voltage than the - terminal and the photo-coupler is energized.



Open Collector Input Spec.

Input power source for interface.

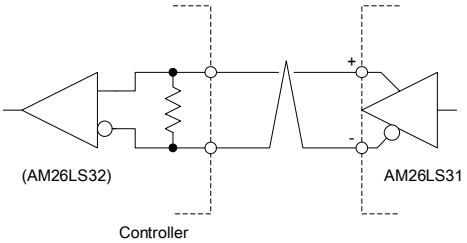
Input is in the on-state when the photo-coupler is energized.



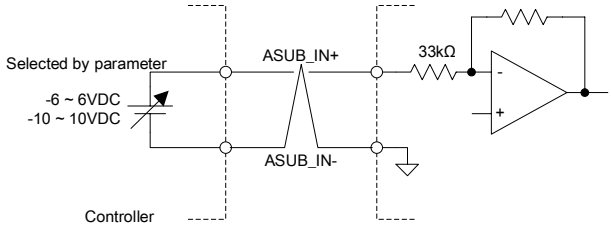
[Actual Position Pulse Output] UA_OUT±, DB_OUT±, Z_OUT±

Connect the differential line receiver conforming to RS422A standards, which is equivalent to AM26LS32.

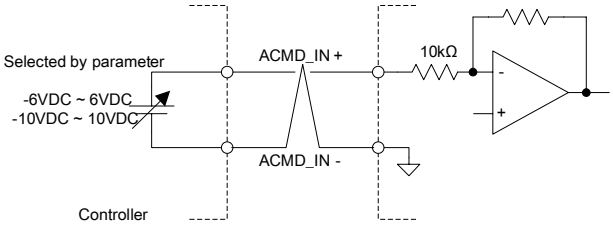
Output is in the on-state when the + terminal becomes a higher voltage than the - terminal.



[Analog Sub (Auxiliary) Input] ASUB_IN±



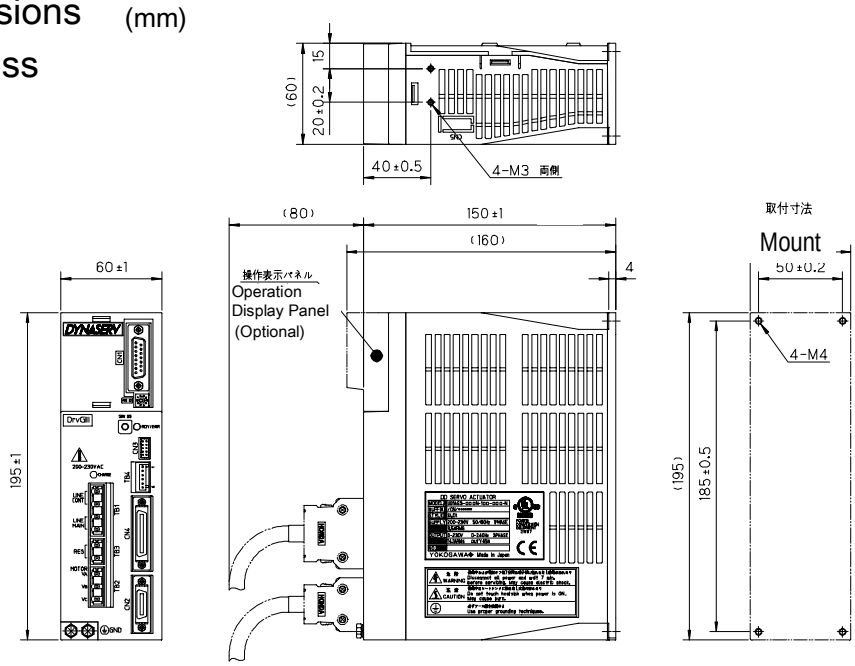
[Analog Command Input] ACMD_IN±



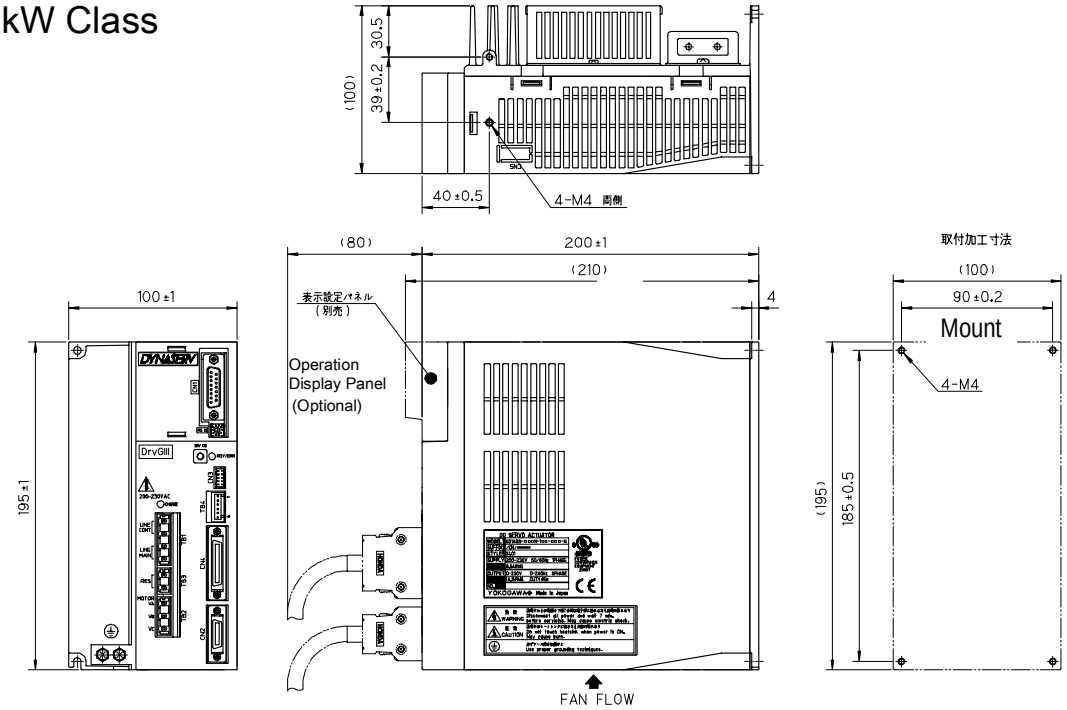
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External Dimensions (mm)

500W Class



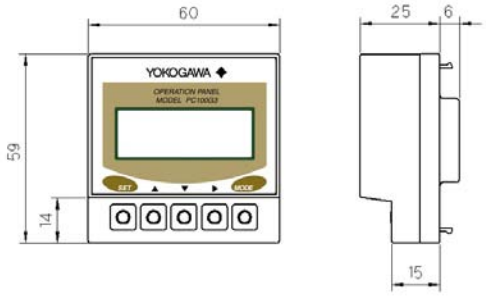
2kW Class



Operation Display Panel (Optional)

Model and Suffix Code : PC100G3

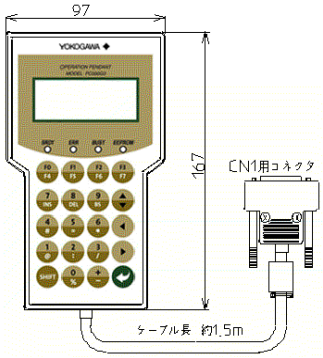
This optional display panel offers the ability to display and set various parameters, and display alarms. Connect to CN1 on the drive



Operation Display Pendant (Optional)

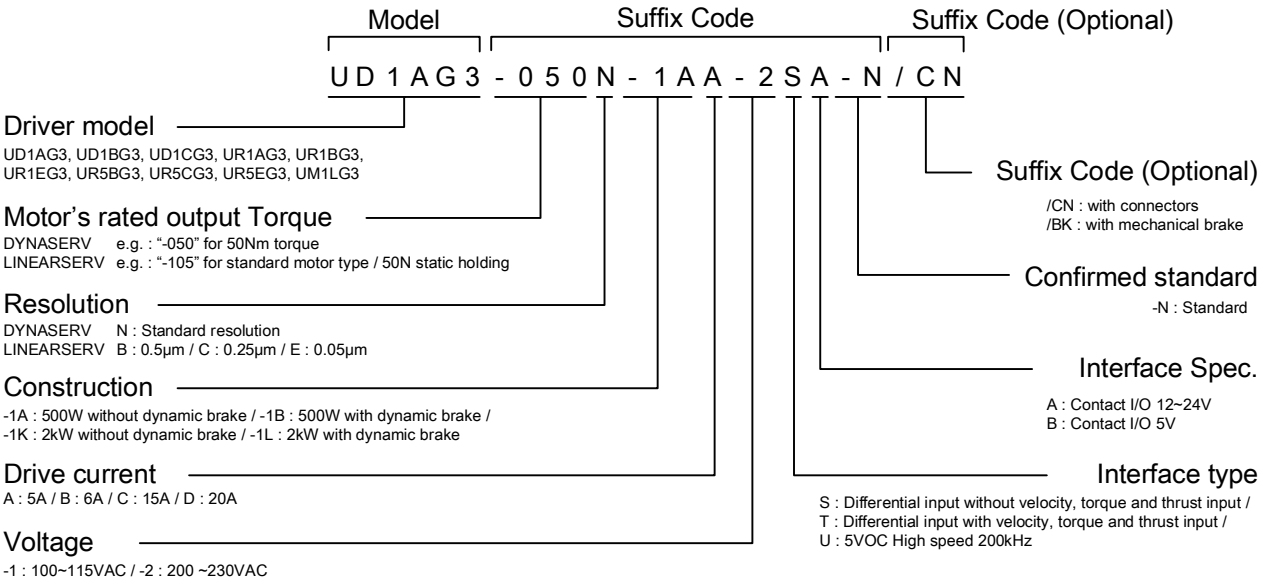
Model and Suffix Code : PC000G3

This optional display pendant offers the ability to display and set various parameters, and display alarms.
In addition, 16 unique drive configurations may be stored on the Pendant.
Connect to CN1 on the drive



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Model and Suffix Codes



Model and Suffix Code Selection List

2kW Class

Model	Suffix Code								Suffix Code (Optional)
	Motor paired	Resolution	Const-ruction	Drive current	Voltage	I/F type	I/F spec.	Confirmed standard	
UD1AG3	-050	N	-1K -1L	D	-1 -2	S T U	A B	-N	/CN
	-100								
	-150								
	-200								
UD1BG3	-015			C					
	-030								
	-045								
	-060								
	-075								
UR1AG3	-050			D					/CN /BK
	-100								
	-150								
	-200								
	-300								
	-400								
UR1BG3	-008			C					
	-015								
	-030								
	-045								
	-060								
UR1EG3	-030			D					/CN
	-070								
	-100								
	-130								
	-160								
	-220								
	-250								
UR5BG3	-010			C	-2				/CN /BK
	-030								
	-050								
	-070								
UR5EG3	-070			D					/CN
	-100								

500W Class

Model	Suffix Code								Suffix Code (Optional)
	Motor paired	Resolution	Const-ruction	Drive current	Voltage	I/F type	I/F spec.	Confirmed standard	
UD1AG3	-050	N	-1A -1B	A	-1 -2	S T U	A B	-N	/CN
UD1BG3	-004			B					
	-006			A					
	-015								
	-030								
UD1CG3	-004								
UR1AG3	-050			B					/CN /BK
UR1BG3	-008								
	-015								
	-030								/CN
UR1EG3	-030								
UR5BG3	-010				-2				/CN /BK
UR5CG3	-005				-1 -2				/CN
	-010								
	-015								
UM1LG3	-105	C E	-1A -1B	A	-1 -2	S T U	A B	-N	/CN
	-110								
	-130								
	-205								
	-210								
	-230								
	-240								
	-305	B							
	-310								
	-330								
	-505								
	-510								
	-530								

Interchangeability between motors and drives is only possible if the drive and motor are compatible (not every motor can be connected to every drive). To determine compatibility, the DYNASERV motor's five digit model and suffix code must match the drive's five digit model and suffix code. For example, using [] to represent the model and suffix code values, the motor's five digit model and suffix code (DM[][]-[][][] or DR[][]-[][][]) must match the drive's model and suffix code (UD[][]G3-[][][] or UR[][]G3-[][][]), respectively. In addition, the current of the drive must also match the motor requirements. For the LINEARSERV, the 3 digit model and suffix code of the motor must match the 3 digit model and suffix code of the drive. Again, the motor's model and suffix code (LM[][][]) must match the drive's model and suffix code (LM1LG3-[][][]). Each motor and head amplifier of the LINEARSERV is adjusted one by one. A different combination causes abnormal operation and damage to the system. Only use the motor and head amplifier having a matching model code, suffix code, and serial number.

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