



Technical Note

Sigma-II, LEGEND, Sigma-III
to Sigma-5 I/O Options

Applicable Products:
SGDH, SGDГ, SGDS, SGDГ





Product: SGDH, SGDG, SGDS, SGDV	Doc#: TN.MCD.14
Title: Sigma-II, LEGEND, Sigma-III to Sigma-5 I/O Options	

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1 Overview

This document is a guide to provide **I/O** options when a system has implemented a Sigma-II, Sigma-III, or LEGEND amplifier, and is being migrated to a Sigma-5 amplifier. This document disregards RoHS since the Sigma-II, LEGEND, and Sigma-III system do not meet the RoHS standard.





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2 Amplifier I/O Connectors & Cables

Three items related to CN1 I/O must be considered when converting a Sigma-II, Sigma-III, or LEGEND amplifier to a Sigma-5 amplifier:

1. Connector terminal size (connector must be the same number of pins)
2. Connector case size (interference with other connectors)
3. Terminal layout

Use Table 1 as described below for determining what items to consider.

1. Determine the system to be **migrated from** by looking at the first row and choosing the amplifier of the system.
2. Determine the system to be **migrated to** by looking at the first column and choosing the amplifier of the new system.
3. Look at the chart to determine compatibility or recommendations. See the referenced sections in this document for complete considerations.



1. Migrate From  2. Migrate To 	Sigma-II (all models) SGDH-* CN1 I/O: 50-pin	LEGEND (all models) SGDG-* CN1 I/O: 36-pin	Sigma-III (all MECHATROLINK models) SGDS-□□1□-□ CN1 I/O: 26-pin
Sigma-5 Analog/Pulse SGDV-□□□□0□□ CN1 I/O: 50-pin	Compatible See Section 3: <i>Sigma-II to Sigma-5 Analog/Pulse</i>	Workable Compatibility See Section 6: <i>LEGEND to Sigma-5 Analog/Pulse</i>	Not Recommended 1. 26-pin Sigma-III connector does not fit into 50-pin Sigma-5 connector. 2. MECHATROLINK to Analog is not a typical transition.
Sigma-5 MECHATROLINK-II (M-II) SGDV-□□□□1□□ CN1 I/O: 26-pin	Workable Compatibility See Section 4: <i>Sigma-II to Sigma-5 MECHATROLINK</i>	Not Recommended 1. 36-pin LEGEND connector does not fit into 26-pin Sigma-5 connector. 2. LEGEND (Torque) to M-II is not a typical transition.	Compatible See Section 7: <i>Sigma-III to Sigma-5 MECHATROLINK</i>
Sigma-5 Option-Style SGDV-□□□□E□□ CN1 I/O: 26-pin	Workable Compatibility See Section 5: <i>Sigma-II to Sigma-5 Option Amplifiers</i>	Not Recommended 1. 36-pin LEGEND connector does not fit into 26-pin Sigma-5 connector. 2. LEGEND (Torque) to option-style is not a typical transition.	Not Recommended 1. MECHATROLINK to option-style is not a typical transition.

Table 1: CN1 migration considerations





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3 Sigma-II to Sigma-5 Analog/Pulse Amplifiers

This section only applies to migrating from a Sigma-II amplifier to a Sigma-5 **Analog/Pulse** amplifier. The terminal sizes are the same (50-pin) for the Sigma-II amplifier and the Sigma-5 Analog/Pulse amplifier. However, the connector case size and the terminal layout for CN1 I/O are not the same.

3.1 Connector Case Size

Various connectors & cables by Yaskawa that plug into the 50-pin CN1 port of the Sigma-II have connector cases that are **wide**, which means they might interfere with other connectors on some models of Sigma-5 Analog/Pulse amplifiers. These are listed in Table 2. Installations where connectors interfere with other connectors may not pass some approvals necessary for machine installations. Figure 1 is an illustration of the connector case width comparison of a Sigma-II 50-pin connector case, and a Sigma-5 50-pin connector case.

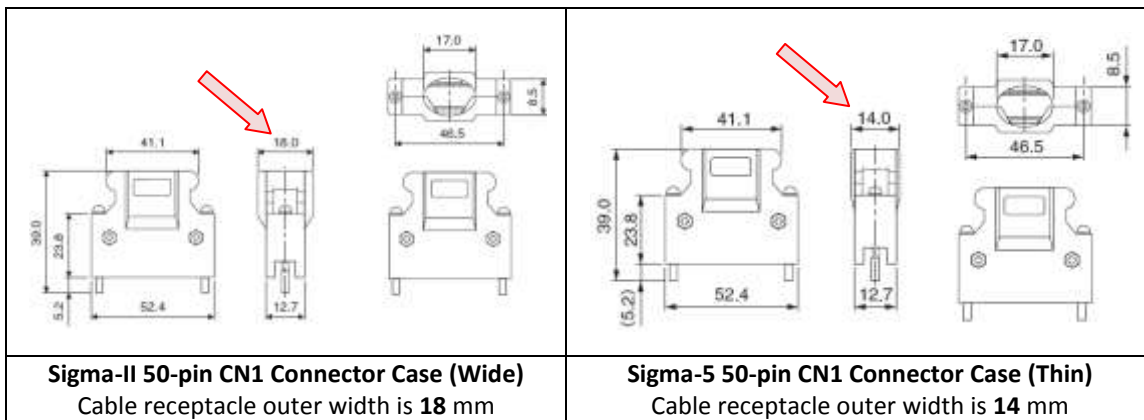


Figure 1: Connector case width differences





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3.1.1 Wide Or Thin CN1 Cable Or Connector

- For situations where the **wide** Sigma-II CN1 part is used (Table 2), a replacement part will be needed.
- For situations where the **thin** Sigma-II CN1 part is used (Table 3), no replacement part is necessary when using any Sigma-5 amplifier (there is no width restriction).

Sigma-II CN1 Part	Description
JUSP-TA50P	CN1 Cable & Terminal Block
JZSP-CKI01-□□(A)	CN1 Cable w/Flying Leads
JZSP-CKI0D-□□	CN1 Cable w/Female D-Sub output Connector (connector cases)
CKI-NS600D-□□ ^{*2}	CN1+CN4 Cable w/Female D-Sub output Connector (NS600 & SGDH)
CKI-NS300D-□□ ^{*3}	CN1+CN4 Cable w/Female D-Sub output Connector (NS300/500 & SGDH)
CKI-MP940D-□□ ^{*4}	CN1+I/O Cable w/Female D-Sub output Connector (MP940 & SGDH)
JZSP-CKI9	CN1 Connector Kit

Table 2: Sigma-II CN1 parts that are **wide**

Sigma-II CN1 Part	Description
JZSP-CKI0D-□□(A)	CN1 Cable w/Female D-Sub output Connector (overmolded)
JUSP-WA50P-□□	I/O Terminal Block Converter with included overmolded cable JZSP-CKI0D-□□(A)

Table 3: Sigma-II CN1 parts that are **thin**





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3.1.2 Sigma-5 Amplifier CN1 Width Restriction

The Sigma-5 amplifiers **with** the width restriction are listed in Table 4 below.

100V	200V
SGDV-R70F	SGDV-R70A
SGDV-R90F	SGDV-R90A
SGDV-2R1F	SGDV-1R6A
	SGDV-2R8A

Table 4: Sigma-5 Amplifiers that **cannot** accept the **wide** 50-pin Sigma-II CN1 parts

- If a **wide** Sigma-II CN1 part (from Table 2) is used in combination with the amplifiers listed in Table 4, a replacement CN1 part is necessary in order for the CN1 part to properly fit into the amplifier.
- If a **thin** Sigma-II CN1 part (from Table 3) is used in combination with any of the amplifiers listed in Table 4 or Table 5, **no replacement** CN1 part is necessary.

The Sigma-5 amplifiers **without** the width restriction are listed in Table 5 below.

100V	200V	400V
SGDV-2R8F	SGDV-3R8A	SGDV-1R9D
	SGDV-5R5A	SGDV-3R5D
	SGDV-7R6A	SGDV-5R4D
	SGDV-120A	SGDV-8R4D
	SGDV-180A	SGDV-120D
	SGDV-200A	SGDV-170D
	SGDV-330A	SGDV-210D
	SGDV-470A	SGDV-260D
	SGDV-550A	SGDV-280D
	SGDV-590A	SGDV-370D
	SGDV-780A	

Table 5: Sigma-5 Amplifiers that **can** accept any of the 50-pin Sigma-II CN1 parts

- If a **wide** Sigma-II CN1 part is used in combination with the amplifiers listed in Table 4, **no replacement** CN1 part is necessary.
- If a **thin** Sigma-II CN1 part is used in combination with any of the amplifiers listed in Table 4 or Table 5, **no replacement** CN1 part is necessary.





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3.1.3 CN1 Cable Or Connector Replacements

The following solutions are available for situations where the Sigma-5 amplifiers listed in Table 4 are used in combination with a **wide** CN1 part from Table 2:

- Solution 1: Replace the Sigma-II CN1 part with a Sigma-5 CN1 part as shown in Table 6. This is a direct replacement and may require re-soldering or re-wiring.
- Solution 2: Replace the Sigma-II CN1 part with the CN1 Cable w/Flying Leads (JZSP-CSI01-□-E). Re-wiring may be required in this solution.
- Solution 3: Replace the **connector case** of the Sigma-II CN1 part with a replacement connector case as shown in Table 6. The existing **terminal** on the Sigma II CN1 part does not have to be replaced (it will fit into the replacement connector case). The **ground strap** that comes with the connector case must replace the ground strap on the Sigma-II CN1 part, otherwise the connector case will not close.

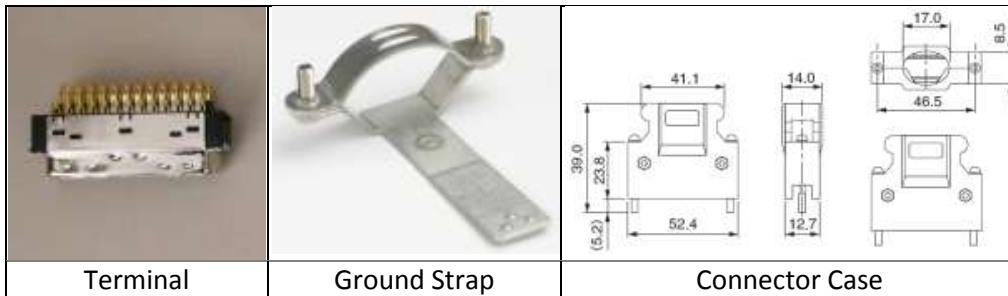


Figure 2: Images of Connector components

If the cable has a grommet, it will need to be changed to a smaller grommet to allow the new ground strap to be used. This is due to the ground strap having a smaller clamping size. The ground strap's function is to connect the cable shield to the ground of the terminal, and also provide as a means to hold the cable tightly into the connector case. Figure 3 shows an image of the ground strap opening with approximate measurements to assist in determining the cable change requirements in order to use the ground strap.

Only use a replacement connector case if the 50-pin CN1 I/O of the existing Sigma-II part is sufficient for the application, otherwise, replace the cable with a cable that is sufficient for the application. For example, the CKI-NS300D-□□ cable will not have 1 of its branches utilized (the NS300 branch), so only use a replacement connector case on the 50-pin Sigma-II CN1 I/O connector if the CN1 I/O portion of the cable is sufficient for the application.





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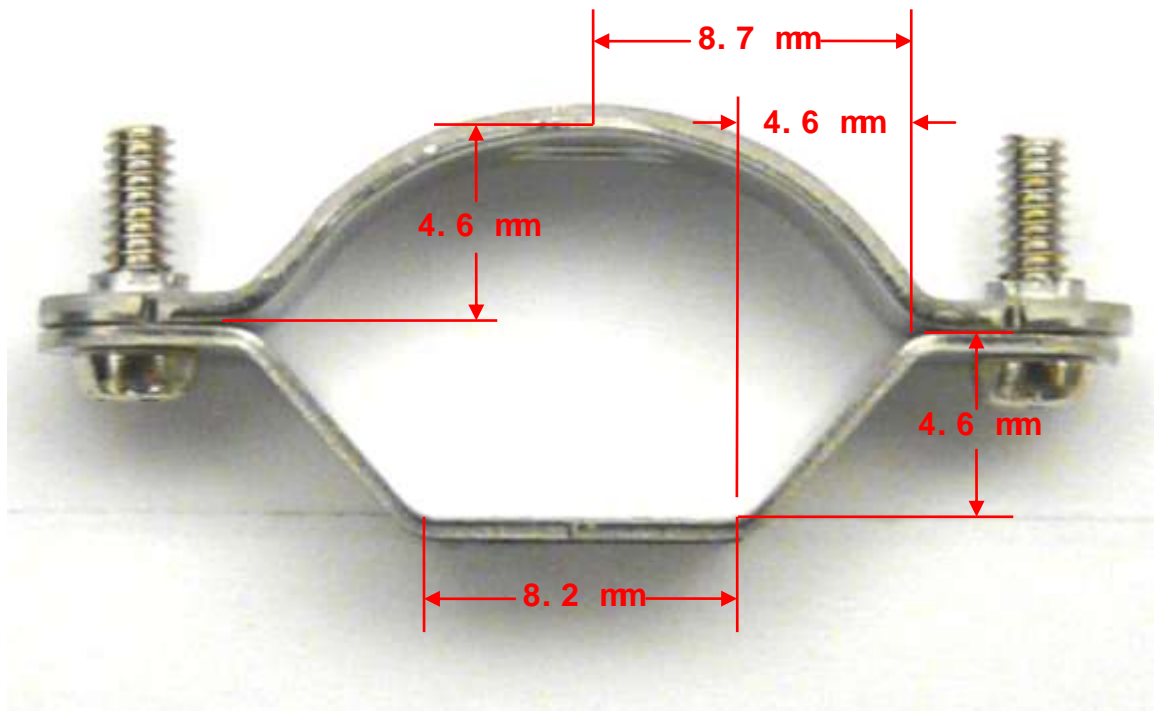


Figure 3: Ground strap opening with approximate measurements





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Sigma-II CN1 Part	Sigma-5 CN1 Part	Description	Replacement Connector Case ^{*1}
JUSP-TA50P ^{*5}	JUSP-TA50PG-E ^{*5}	CN1 Cable & Terminal Block	10350-52Z0-008
JZSP-CKI01-□□(A) ^{*5}	JZSP-CSI01-□-E ^{*5}	CN1 Cable w/Flying Leads	10350-52Z0-008
JZSP-CKI0D-□□	<i>(no equivalent)</i>	CN1 Cable w/Female D-Sub output Connector (connector cases)	10350-52Z0-008
CKI-NS600D-□□ ^{*2}	<i>(no equivalent)</i>	CN1+CN4 Cable w/Female D-Sub output Connector (NS600 & SGDH)	10350-52Z0-008
CKI-NS300D-□□ ^{*3}	<i>(no equivalent)</i>	CN1+CN4 Cable w/Female D-Sub output Connector (NS300/500 & SGDH)	10350-52Z0-008
CKI-MP940D-□□ ^{*4}	<i>(no equivalent)</i>	CN1+I/O Cable w/Female D-Sub output Connector (MP940 & SGDH)	10350-52Z0-008
JZSP-CKI9 ^{*5}	JZSP-CSI9-1-E ^{*5}	CN1 Connector Kit	10350-52Z0-008

Table 6: Sigma-5 equivalent CN1 parts and replacement connector case

Notes:

- *1 Manufacturer: Sumitomo 3M Ltd. (also, this is a non-stock product in 3M US).
- *2 This is a split cable that has connectors for both the 50-pin amplifier and the 36-pin NS600 CN4. There is no plug for the 36-pin connector in a Sigma-5 system. The connector case listed is for the 50-pin connector only.
- *3 This is a split cable that has connectors for both the 50-pin amplifier and the 20-pin NS300/500 CN4. There is no plug for the 20-pin connector in a Sigma-5 system. The connector case listed is for the 50-pin connector only.
- *4 This is a split cable that has connectors for both the 50-pin amplifier and the 50-pin MP940 I/O. Only the 50-pin CN1 connector for the amplifier will plug into the Sigma-5 amplifier. The other 50-pin I/O connector has no use in a Sigma-5 system.
- *5 In the Sigma-II column, these parts have a **wide** connector. In the Sigma-5 column, these parts have a **thin** connector. Refer to Figure 1 for definitions of **wide** and **thin**.

Sigma-II CN1 Part	Description
JZSP-CKI0D-□□(A)	CN1 Cable w/Female D-Sub output Connector (overmolded)
JUSP-WA50P-□□	I/O Terminal Block Converter with included overmolded cable JZSP-CKI0D-□□(A)

Table 7: Sigma-2 CN1 parts that are **thin** (no need to find a replacement CN1 part)





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3.2 Terminal Layout

The connectors & cables by Yaskawa that plug into the 50-pin CN1 port of the Sigma-II have the same terminal layout as the Sigma-5 Analog/Pulse amplifiers, with an exception of the PSO signals not being available on the Sigma-5.

2	SG	GND	1	SG	GND	27	/TGON-	TGON signal output	26	/V-CMP- (VCON-)	Speed coincidence detection output
4	SEN	SEN signal input	3	PL1	Open-collector reference power supply	28	/IS-RDY+	Servo ready output	28	/TGON	TGON signal output
6	SG	GND	5	V-REF	Reference speed input	31	ALM+	Servo alarm output	30	/S-RDY	Servo ready output
8	/PULS	Reference pulse input	7	PULS	Reference pulse input	33	/PAO	PG divided output A-phase	32	ALM	Servo alarm output
10	SG	GND	9	T-REF	Torque reference input	35	/PBO	PG divided output B-phase	34	/PAO	PG divided output A-phase
12	/SIGN	Reference sign input	11	/SIGN	Reference sign input	37	AL01	Alarm code output	36	/PBO	PG divided output B-phase
14	/CLR	Clear input	13	PL2	Open-collector reference power supply	39	AL03	Open-collector output	38	AL02	Alarm code output
16	—	—	15	CLR	Clear input	41	/P-CON	P operation input	40	/S-ON	Servo ON input
18	PL3	Open-collector reference power supply	17	—	—	43	N-OT	Reverse overtravel input	42	/P-OT	Forward overtravel input
20	/PCO	PG divided output C-phase	19	PCO	PG divided output C-phase	45	/P-CL	Forward current limit ON input	44	/AJM-RST	Alarm reset input
22	BAT (+)	Battery (+)	21	BAT (+)	Battery (+)	47	+24V -IN	External input power supply	46	/N-CL	Reverse current limit ON input
24	—	—	23	—	—	49	/PSO	S-phase signal output	48	PSO	S-phase signal output
			25	/V-CMP+ (VCON+)	Speed coincidence detection output	50	—	—	50	—	—

Sigma-II CN1 I/O Terminal Layout

2	SG	GND	1	SG	GND	27	/TGON+	TGON signal output	26	/V-CMP- (VCON-)	Speed coincidence detection output
4	SEN	SEN signal input	3	PL1	Power supply for open-collector reference	29	/S-RDY+	Servo ready output	28	/TGON	TGON signal output
6	SG	GND	5	V-REF	Speed reference input	31	ALM+	Servo alarm output	30	/S-RDY-	Servo ready output
8	/PULS	Reference pulse input	7	PULS	Reference pulse input	33	/PAO	Encoder output pulse Phase A	32	ALM-	Servo alarm output
10	SG	GND	9	T-REF	Torque reference input	35	/PBO	Encoder output pulse Phase B	34	/PAO	Encoder output pulse Phase A
12	/SIGN	Reference sign input	11	/SIGN	Reference sign input	37	ALD1	Alarm code output	36	/PBO	Encoder output pulse Phase B
14	/CLR	Clear input	13	PL2	Power supply for open-collector reference	39	ALD3	Alarm code output	38	ALD2	Alarm code output
16	—	—	15	CLR	Clear input	41	/P-CON	F control input	40	/S-ON	Servo ON input
18	PL3	Power supply for open-collector reference	17	—	—	43	/N-OT	Reverse run prohibit input	42	/P-OT	Forward run prohibit input
20	/PCO	Encoder output pulse Phase C	19	PCO	Encoder output pulse Phase C	45	/P-CL	Forward external torque limit input	44	/AJM-RST	Alarm reset input
22	BAT (+)	Battery (+)	21	BAT (+)	Battery (+)	47	+24V IN	External input power supply	46	/N-CL	Reverse external torque limit input
24	—	—	23	—	—	49	—	—	48	—	—
			25	/V-CMP+ (VCON+)	Speed coincidence detection output	50	—	—	50	—	—

Sigma-5 Analog/Pulse CN1 I/O Terminal Layout

Figure 4: Sigma-II and Sigma-5 Analog/Pulse CN1 terminal comparisons (48 and 49 are different)

3.2.1 Absolute Encoder Output Data (PSO) Sigma-II to Sigma-5

Applications that utilize the signals on the PSO signals (pins 48 & 49) will need to have implemented the Sigma-5 amplifier's method of transmitting the absolute encoder output data, which is on the PAO, PBO, and PCO pins. Refer to the *Sigma-5 Series Design and Maintenance User's Manual for Analog/Pulse Amplifiers* (Manual number SIEP S80000 45), Section 5.9.6 *Absolute Encoder Reception Sequence* for details.



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4 Sigma-II to Sigma-5 MECHATROLINK Amplifiers

This section only applies to migrating from a Sigma-II amplifier to a Sigma-5 **MECHATROLINK** amplifier. The terminal sizes are the different for the Sigma-II amplifier (50-pin) and the Sigma-5 MECHATROLINK amplifier (26-pin). This means neither the Sigma-II cable nor connector can be used directly with the Sigma-5 MECHATROLINK amplifier (a new cable or connector is needed, or an adapter), and also the terminal layout must be considered.

4.1 Cables & Connectors

The parts shown in Table 8 can be used for Sigma-5 MECHATROLINK CN1 I/O. This list does not contain any kind of adapter cable or device, so the existing Sigma-II CN1 I/O cable or connector will have to be replaced if using a part from this table (adapter cables/devices are not available at the time of this publication).

Sigma-5 CN1 Part	Description
SBK-U-VBA-□□	CN1 Cable & Terminal Block
JZSP-CSI02-□-E	CN1 Cable w/Flying Leads
JZSP-CSI9-2-E	CN1 Connector Kit

Table 8: Sigma-5 MECHATROLINK CN1 I/O cables and connector kit





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4.2 Terminal Layout

The Sigma-II amplifier has a different terminal layout from the Sigma-5 MECHATROLINK amplifier. Refer to the user's manuals for each product for specific details of each pin function.

2	SG	GND	1	SG	GND	26	/V-CMP- (VCON-)	Speed coincidence detection output	14	BAT(+)	Battery (+) input	15	BAT(-)	Battery (-) input
4	SEN	SEN signal input	3	PL1	Open-collector reference power supply	27	/TIGON-	TIGON signal output	16	SG	Signal ground	17	PAO	PG dividing pulse (Phase-A) output
6	SG	GND	5	V-REF	Reference speed input	28	/S-RDY+	Servo ready output	18	/PAO	PG dividing pulse (Phase-A) output	19	/PBO	PG dividing pulse (Phase-B) output
8	/PULS	Reference pulse input	7	PULS	Reference pulse input	30	/S-RDY	Servo ready output	20	/PBO	PG dividing pulse (Phase-B) output	21	PCO	PG dividing pulse (Phase-C) output
10	SG	GND	9	T-REF	Torque reference input	31	ALM+	Servo alarm output	22	/PCO	PG dividing pulse (Phase-C) output	23	/SOC+	General-purpose input
12	/SIGN	Reference symbol input	11	SIGN	Reference sign input	33	PAO	PG divided output A-phase	24	/SOC-	General-purpose input	25	/SOC+	General-purpose input
14	XCLR	Clear input	13	PL2	Open-collector reference power supply	34	/PAO	PG divided output A-phase	26	/SOC-	General-purpose input			
16	—	—	15	CLR	Clear input	35	/PBO	PG divided output B-phase						
18	PL3	Open-collector reference power supply	17	—	—	37	ALB1	Alarm code output						
20	/PCO	PG divided output C-phase	16	PCO	PG divided output C-phase	38	ALB2	Alarm code output						
22	BAT (-)	Battery (-)	21	BAT (+)	Battery (+)	40	SI-ON	Servo ON input						
24	—	—	23	—	—	42	P-OT	Forward overtravel input						
			25	/V-CMP+ (VCON+)	Speed coincidence detection output	43	N-OT	Reverse overtravel input						
						44	JALM-RST	Alarm reset input						
						45	/N-CL	Reverse current limit ON input						
						47	+24V -IN	External input power supply						
						48	/PSO	S-phase signal output						
						49	—	—						
						50	—	—						

Sigma-II CN1 I/O Terminal Layout

Sigma-5 MECHATROLINK CN1 I/O Terminal Layout

Figure 5: Sigma-II and Sigma-5 MECHATROLINK CN1 terminal comparisons

4.3 Workable Compatibility

Since the functions of the Sigma-5 MECHATROLINK amplifier can meet some of the functions of the Sigma-II amplifier, the Sigma-5 signals can be used in place of some of the Sigma-II signals. These signals can be mapped from the Sigma-II amplifier to the Sigma-5 MECHATROLINK amplifier according to the application.



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5 Sigma-II to Sigma-5 Option Amplifiers

This section only applies to migrating from a Sigma-II amplifier to a Sigma-5 **Option-Style** amplifier. The terminal sizes are the different for the Sigma-II amplifier (50-pin) and the Sigma-5 Option-Style amplifier (26-pin). This means neither the Sigma-II cable nor connector can be used directly with the Sigma-5 Option-Style amplifier (a new cable or connector is needed, or an adapter), and also the terminal layout must be considered.

5.1 Cables & Connectors

The parts shown in Table 9 can be used for Sigma-5 Option-Style CN1 I/O. This list does not contain any kind of adapter cable or device, so the existing Sigma-II CN1 I/O cable or connector will have to be replaced if using a part from this table (adapter cables/devices are not available at the time of this publication).

Sigma-5 CN1 Part	Description
SBK-U-VBA-□□	CN1 Cable & Terminal Block
JZSP-CSI02-□-E	CN1 Cable w/Flying Leads
JZSP-CSI9-2-E	CN1 Connector Kit

Table 9: Sigma-5 Option-Style CN1 I/O cables and connector kit





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5.2 Terminal Layout

The Sigma-II amplifier has a different terminal layout from the Sigma-5 option-style amplifier. Refer to the user's manuals for each product for specific details of each pin function. For the Sigma-5 option-style amplifier, refer to the option module's user's manual.

2	SG	GND	1	SG	GND	27	/TGON-	TGON signal output	29	/V-CMP- (VCON-)	Speed coincidence detection output
4	SEN	SEN signal input	3	FL1	Open-collector reference power supply	28	/IS-RDY+	Servo ready output	28	/TGON	TGON signal output
6	SG	GND	5	V-REF	Reference speed input	31	ALM+	Servo alarm output	30	/S-RDY	Servo ready output
8	/PULS	Reference pulse input	7	PULS	Reference pulse input	32	ALM	Servo alarm output	32	ALM	Servo alarm output
10	SG	GND	9	T-REF	Torque reference input	33	/PAO	PG divided output A-phase	34	/PAO	PG divided output A-phase
12	/SIGN	Reference symbol input	11	SIGN	Reference sign input	35	/PBO	PG divided output B-phase	36	/PBO	PG divided output B-phase
14	/CLR	Clear input	13	PL2	Open-collector reference power supply	37	AL01	Alarm code output	38	AL02	Alarm code output
16	—	—	15	CLR	Clear input	39	AL03	Open-collector output	40	/S-ON	Servo ON input
18	FL3	Open-collector reference power supply	17	—	—	41	P-CON	P operation input	42	P-OT	Forward overtravel input
20	/PCO	PG divided output C-phase	19	PCO	PG divided output C-phase	43	N-OT	Reverse overtravel input	44	/ALM-RST	Alarm reset input
22	BAT (+)	Battery (+)	21	BAT (+)	Battery (+)	45	/IP-CL	Forward current limit ON input	46	/IN-CL	Reverse current limit ON input
24	—	—	23	—	—	47	+24V -IN	External input power supply	48	PSO	S-phase signal output
			25	/V-CMP+ (VCON+)	Speed coincidence detection output	49	/PSO	S-phase signal output	50	—	—

Sigma-II CN1 I/O Terminal Layout

Signal	Pin No.	Name	Signal	Pin No.	Name
/SI3	9	Command option module input 3	ALM+	3	Servo alarm output
P-OT	7	Forward run prohibited	ALM-	4	Servo alarm output
N-OT	8	Reverse run prohibited	/BK+ (/SO1+)	1	Brake output
/SI4	10	Command option module input 4	/BE- (/SO1-)	2	
/SI5	11	Command option module input 5	/SO2+	23	General-purpose output
/SI6	12	Command option module input 6	/SO2-	24	
+24VIN	6	Control power supply input for sequence signal	/SO3+	25	
BAT(+)	14	Battery (+) input	/SO3-	26	
BAT(-)	15	Battery (-) input	FG	Connector shell	Frame ground
/SI0	13	General-purpose input			

Sigma-5 Option-Style CN1 I/O Names & Functions

Figure 6: Sigma-II and Sigma-5 Option-Style CN1 terminal comparisons

5.3 Workable Compatibility

Since the functions of the Sigma-5 option-style amplifier can meet some of the functions of the Sigma-II amplifier, the Sigma-5 signals can be used in place of some of the Sigma-II signals. These signals can be mapped from the Sigma-II amplifier to the Sigma-5 option-style amplifier according to the application.





Product: SGDH, SGD, SGDS, SGDV	Doc#: TN.MCD.14
Title: Sigma-II, LEGEND, Sigma-III to Sigma-5 I/O Options	

6 LEGEND to Sigma-5 Analog/Pulse Amplifiers

This section only applies to migrating from a LEGEND amplifier to a Sigma-5 **Analog/Pulse** amplifier. The terminal sizes are the different for the LEGEND amplifier (36-pin) and the Sigma-5 Analog/Pulse amplifier (50-pin). This means neither the LEGEND cable nor connector can be used directly with the Sigma-5 amplifier (a new cable or connector is needed, or an adapter cable), and also the terminal layout must be considered.

6.1 Cables & Connectors

The parts shown in Table 10 can be used for Sigma-5 Analog/Pulse CN1 I/O and CN5 Analog Output. This list does not contain any kind of adapter cable or device, so the existing LEGEND I/O cable or connector will have to be replaced if using a part or parts from this table (adapter cables/devices from Yaskawa are not available at the time of this publication).

Sigma-5 Part	Description
JUSP-TA50PG-E	CN1 Cable & Terminal Block
JZSP-CSI01-□-E	CN1 Cable w/Flying Leads
JZSP-CSI9-1-E	CN1 Connector Kit
JZSP-CA01	CN5 Analog Monitor Cable

Table 10: Sigma-5 Analog/Pulse CN1 I/O cables and connector kit & CN5 cable





Product: SGDH, SGDG, SGDS, SGDV	Doc#: TN.MCD.14
Title: Sigma-II, LEGEND, Sigma-III to Sigma-5 I/O Options	

6.2 Terminal Layout

The LEGEND amplifier has a different terminal layout from the Sigma-5 Analog/Pulse amplifier. Refer to the user's manuals for each product for specific details of each pin function. The analog output signals of the Sigma-5 Analog/Pulse amplifier are located on CN5.

1	---	---	16	GND	GND	23	PAO	Encoder Divided Output A phase
3	CMD-IN	Torque Feedback Input	2	GND	GND	21	*FAO	Encoder Divided Output A phase
5	---	---	4	GND	GND	23	*FBO	Encoder Divided Output B phase
7	RLN+	RLN Signal Output	6	GND	GND	25	*FCO	Encoder Divided Output C phase
9	---	---	8	---	---	27	DB OFF1	DB OFF Signal Input
11	---	---	10	RLN-	RLN Signal Output	29	Torque Mon	Torque Monitor 5V/Max. Torque
13	+14V	External Power Input	12	---	---	30	---	---
15	DB OFF	DB OFF Signal Input	14	IS-ON	Servo ON Signal Input	32	---	---
17	---	---	18	---	---	34	ALM+	Servo Alarm Output
			18	---	---	36	---	---

LEGEND CN1 I/O Terminal Layout

2	SG	GND	5	SG	GND	27	/TOON+	TOON signal output	26	/V-CMP-(/CON-)	Speed coincidence detection output
4	SEN	SEN signal input	3	PL1	Power supply for open-collector reference	29	/S-RDY+	Servo ready output	28	/TOON-	TOON signal output
6	SG	GND	5	V-REF	Speed reference input	31	ALM+	Servo alarm output	30	/S-RDY-	Servo ready output
8	PULSE	Reference pulse input	7	PULSE	Reference pulse input	33	PAO	Encoder output pulse Phase A	32	ALM-	Servo alarm output
10	SG	GND	9	T-REF	Torque reference input	35	PBO	Encoder output pulse Phase B	34	*FAO	Encoder output pulse Phase A
12	/SIGN	Reference sign input	11	SIGN	Reference sign input	37	ALD1	Alarm code output	36	*FBO	Encoder output pulse Phase B
14	/CLR	Clear input	13	PL2	Power supply for open-collector reference	39	ALD3	Alarm code output	38	ALD2	Alarm code output
16	---	---	15	CLR	Clear input	41	/P-CON	P control input	40	/S-ON	Servo ON input
18	PL3	Power supply for open-collector reference	17	---	---	43	/N-DT	Reverse not prohibit input	42	F-CT	Forward run prohibit input
20	/FCO	Encoder output pulse Phase C	19	PCO	Encoder output pulse Phase C	45	/P-CL	Forward external torque limit input	44	/AJM-RST	Alarm reset input
22	BAT (-)	Battery (-)	21	BAT (+)	Battery (+)	47	+24 V IN	External input power supply	46	/4-CL	Reverse external torque limit input
24	---	---	23	---	---	49	---	---	48	---	---
			25	/V-CMP-(/CON+)	Speed coincidence detection output				50	---	---

Sigma-5 CN1 I/O Terminal Layout

Figure 7: LEGEND and Sigma-5 Analog/Pulse CN1 terminal comparisons

6.3 Workable Compatibility

Since the functions of the Sigma-5 Analog/Pulse amplifier can meet the functions of the LEGEND amplifier, the Sigma-5 signals can be used in place of some of the LEGEND signals. These signals can be mapped from the LEGEND amplifier to the Sigma-5 Analog/Pulse amplifier according to the application.





Product: SGDH, SGDG, SGDS, SGDV	Doc#: TN.MCD.14
Title: Sigma-II, LEGEND, Sigma-III to Sigma-5 I/O Options	

7 Sigma-III to Sigma-5 MECHATROLINK Amplifiers

This section only applies to migrating from a Sigma-III MECHATROLINK amplifier to a Sigma-5 **MECHATROLINK** amplifier. The terminal sizes are the same (26-pin) for the Sigma-III system and the Sigma-5 MECHATROLINK system. The connector case size and the pin mapping are also the same.

There are no CN1 migration issues. The CN1 cable or connector used for the Sigma-III can be plugged directly into the Sigma-5 MECHATROLINK amplifier.

