

MELFA
RV-35FR
RV-50FR
RV-80FR

Vertical
35/50/80kg
type

RV-35FR
RV-50FR
RV-80FR

It is ideal for handling large workpieces and heavy objects such as processing machine LD/ULD applications, packing processes, and palletizing processes.

▪ **FR series maximum reach and maximum payload**

Maximum reach :2100mm,payload:35/50/80kg.

▪ **Manage the entire line with a sequencer**

Compatible with the iQ Platform.

Easy linkage with sequencers realizes comprehensive management of the entire line and wiring saving.

▪ **Improvement of safety for collaborative applications**

Functional safety compatible. Realize collaborative work with people and eliminate safety fences.

We support safe and highly efficient line construction.



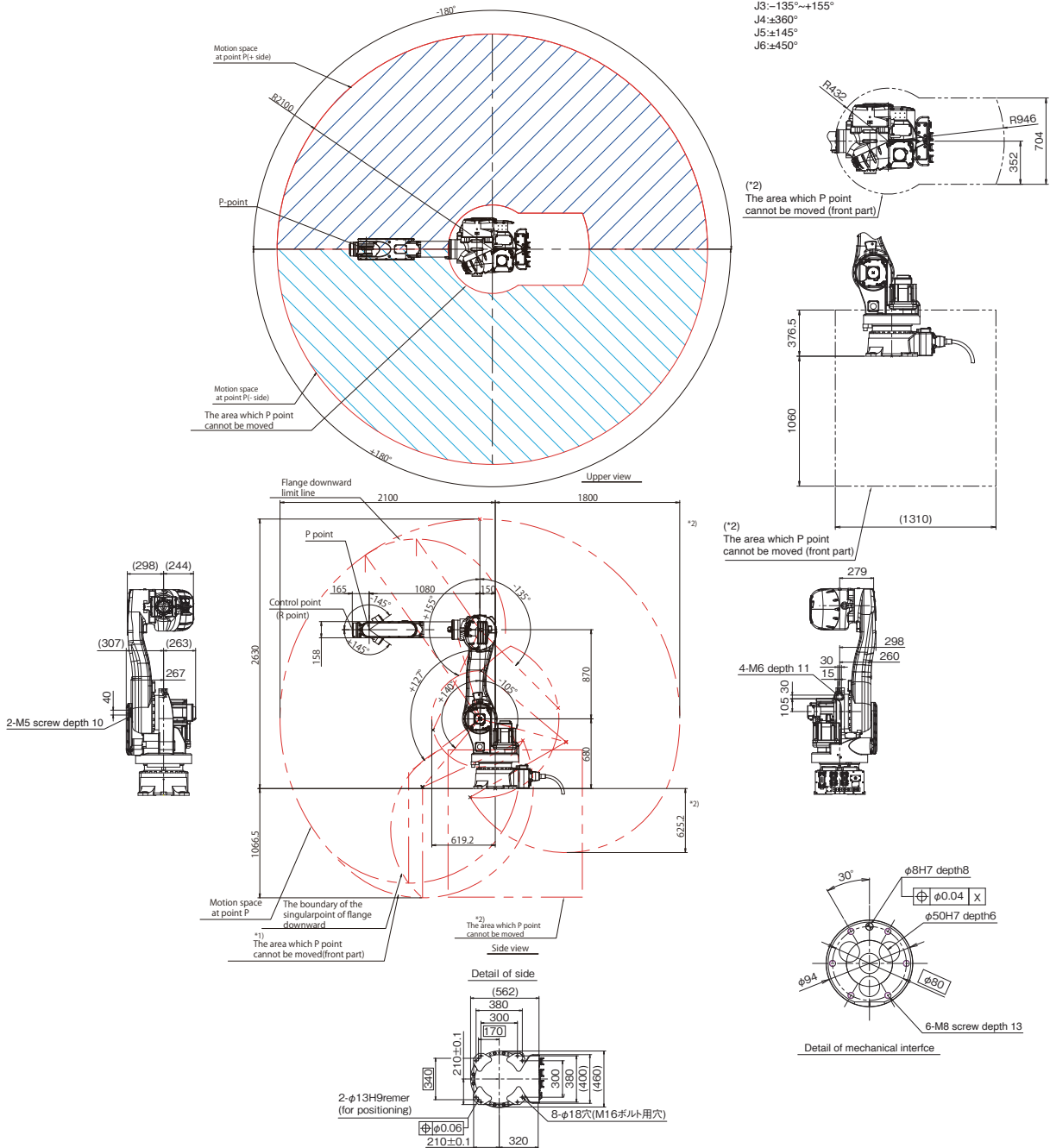
► **Specifications**

Item		Unit	RV-35FR	RV-50FR	RV-80FR
Environmental specifications			Standard/ Oil mist		
Protection degree			Wrist equivalent to IP67,Body equivalent to IP65(standard) Whole body equivalent to IP67(oil mist)		
Installation			Floor type		
Structure			Vertical multiple-joint type		
Degrees of freedom			6		
Drive system			AC servo motor		
Position detection method			Absolute encoder		
Maximum load capacity		kg	35	50	80
Arm length		mm	870+1080		
Maximum reach radius		mm	2100		
Operating range	J1	deg	360 (±180)		
	J2		245 (-105~140)		
	J3		290 (-135~155)		
	J4		720 (±360)		
	J5		290 (±145)		
	J6		900 (±450)		
Maximum speed*1	J1	deg/sec	180	180	180
	J2		180	180	180
	J3		185	185	160
	J4		260	260	185
	J5		260	260	165
	J6		360	360	280
Maximum composite speed*2		mm/sec	13400	13400	12700
Position repeatability		mm	±0.06		
Ambient temperature		°C	0 to 45		
Mass		kg	560		
Tolerable moment	J4	Nm	210	210	336
	J5		210	210	336
	J6		130	130	194
Tolerable amount of inertia	J4	kgm ²	19.6	28	34
	J5		19.6	28	34
	J6		7.7	11	13.7
Tool wiring			12 input points/8 output points LAN x 1 <Category 5e-compliant>		
Tool pneumatic pipes			Φ10×2		
Connected controller			CR860-D/CR860-R/CR860-Q		

*1 Values in the table indicate the maximum speed, and the actual speed of each axis varies depending on factors such as the posture, load, and the amount of movement.

*2 This is the value at the center point of the mechanical interface when all axes are combined. The value is a theoretical value calculated from the maximum speed of each joint.

▶ **External Dimensions/Operating Range Diagram**
RV-35FR/50FR/80FR

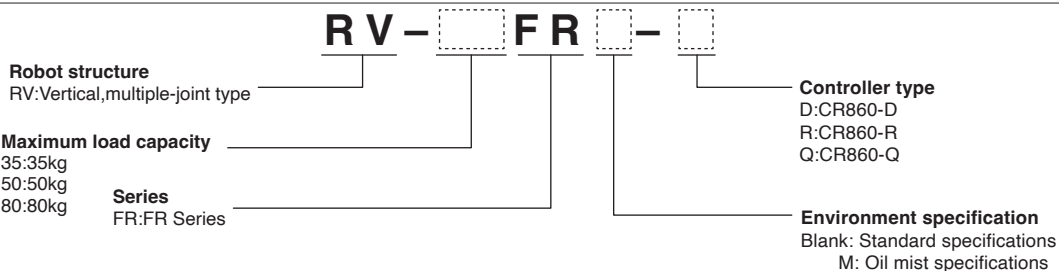


1. The posture of side view

The following figure shows a robot at the position of: J1=0°, J2=0°, J3=90°, J4=0°, J5=0°, J6=0°

2. *1) Rear face operating limit: When the J axis angle is J1 ≤ -137° or +137° ≤ J1, the J2 axis operation is limited to J2 ≤ +127°

3. *2) The area which P point cannot be moved: P point cannot move to this area. This limitation is valid at factory shipping, but it can be released by parameter MELTEXS.



MELFA Controller CR860-R/Q/D

CR860-R
CR860-Q
CR860-D

MELSEC iQ-R/Q compatible robot controller

CR860-R/Q: Uses a multi-CPU configuration that dramatically improves its interaction with FA equipment and also offers highly precise control and fast yet simple information management.

CR860-D: Can be constructed as the control nucleus for robot controllers.



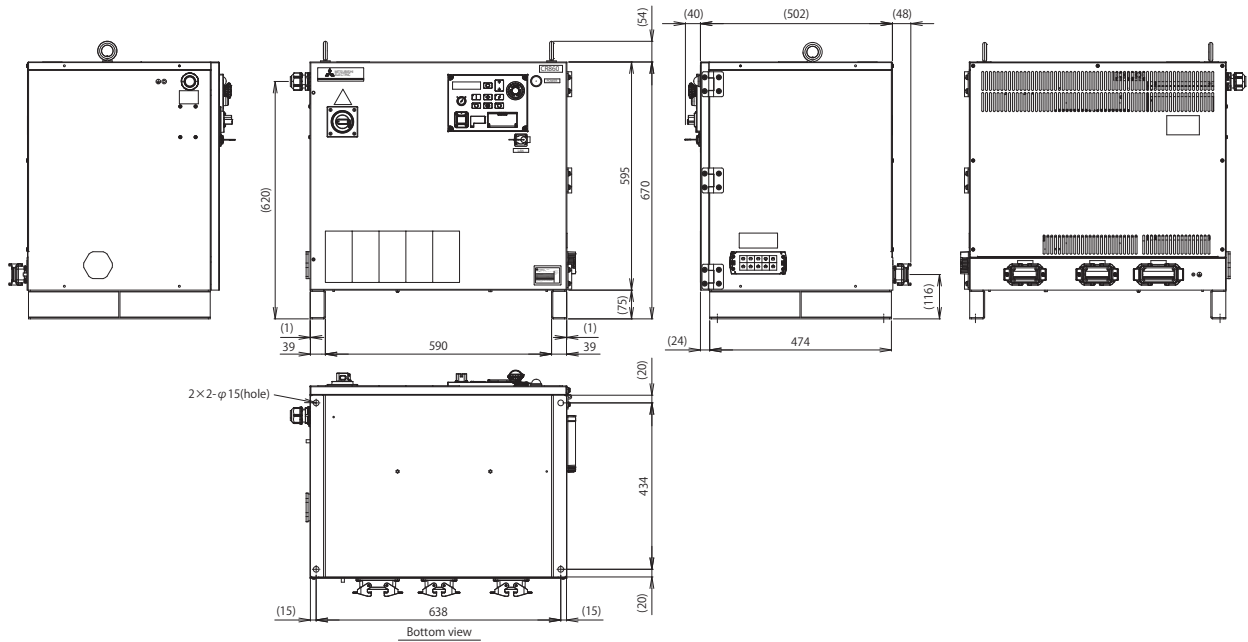
► Specifications

Item		Unit	CR860-R	CR860-Q	CR860-D
Robot CPU			R16RTCPU	Q172DSRCPU	Built-in
Number of axes			Maximum 6 axes + additional 8 axes available		
Programming language			MELFA-BASIC V,VI		
Position teaching method			Teaching or MDI		
Memory capacity	Number of teaching positions	point	39000	26000	39000
	Number of steps	step	78000	52000	78000
	Number of programs	point	512		
External input / output	General-purpose I/O	point	0 input / 0 output (8192 input / 8192 output with the multiple CPU common device)		0 input / 0 output (Up to256 / 256 when options are used)
	Dedicated I/O	point	Assigned to multiple CPU common device		Assigned to general-purpose I/O
	Hand I/O	point	12 input points / 8 putput points		
	External emergency stop input	point	1 (redundant)		
	Emergency stop putput	point	1 (redundant)		
	Enabling device input	point	1 (redundant)		
	Mode putput	point	1 (redundant)		
	Robot error output	point	1 (redundant)		
	Additional axis synchronization output	point	1 (redundant)		
	Door switch input	point	1 (redundant)		
Interface	Encoder input	point	2	Q173DPX (optional)	2
	Additional axis	channel	1 (SSCNET III/H)		
	Remote I/O	channel	1		
	USB	port	1 (USB port of programmable cotroller CPU unit)		1
	Ethernet	port	1 (Dadicated T/B) 1 (1000BASE-T / 100BASE-TX / 10BASE-T)		
	Option slot	slot	1 (Available only for function extension option card)		2
	SD memory card slot	slot	-		1
Power supply	Input voltage range	V	Three-phase 200 to 240 (The rate of power-supply voltage fluctuation is within + 10% to -15%)		
	Power capacity	kVA	7.5 (Inrush current is not included)		
External dimensions	mm	670(W) × 500(D) × 670(H)			
Mass	kg	80			
Ambient temperature	°C	0~45 (Controller) / 0~50 (Robot CPU)		0~45	
Ambient humidity	%RH	10~85			
Structure		Self-contained floor type, Encolse type IP54(FAN part : IP2X)			
Grounding	Ω	100Ω or less (Cisaa D grounding)			

Controller

CR860-R/CR860-Q/R860-D

External Dimensions



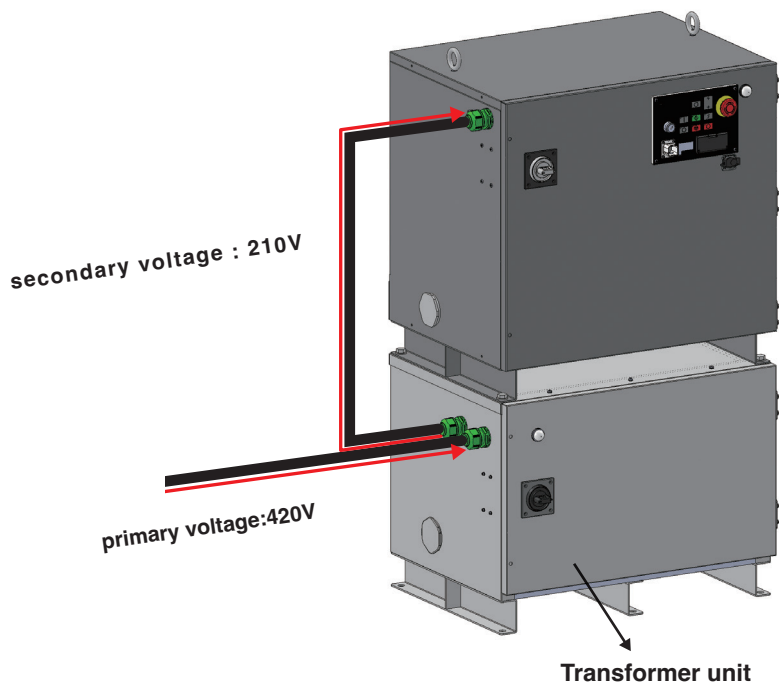
Transformer unit

By using this transformer unit, the robot can be operated with 400V power supply.

This transformer unit is used to step down the voltage from 400V to 200V. This transformer unit is designed only for the CR860 controller, and is not used for other controllers.

Specification

Item	Specifications
External dimensions	670(W) × 500(H) × 515(D)
Color	Dark gray
Weight	Approx. 120kg (only the robot arm, excluding cables)
Phase	Three-phase
Capacity	10kVA
Frequency	50Hz
Rated voltage (primary side)	AC420V(± 10%)
Rated voltage (secondary side)	AC210V(± 5%)
Wiring	Delta connection
Operating temperature	0 to 45°C
Relative humidity	10 to 85%RH
Elevation	1000m or lower
Protection specifications	IP54



OPTIONS

Robot arm options(RV-FR series)

No.	Name	Type	RV					Specifications
			2FR 2FRL	4FR 4FRL	7FR 7FRL	7FRLL	13FR 13FRL 20FR	
①	Solenoid valve set	1E-VD0m (sink) 1E-VD0mE (source)	○	—	—	—	—	1 to 2 valves with solenoid valve cable. m indicates the number of valves (1 or 2); output: Φ4
		1F-VD0m-02 (sink) 1F-VD0mE-02 (source)	—	○	○	○	—	1 to 4 valves with solenoid valve cable. m indicates the number of valves (1, 2, 3, 4); output: Φ4
		1F-VD0m-03 (sink) 1F-VD0mE-03 (source)	—	—	—	—	○	1 to 4 valves with solenoid valve cable. m indicates the number of valves (1, 2, 3, 4); output: Φ6
②	Hand output cable	1E-GR35S	○	—	—	—	—	Straight cable for 2-valve systems, robot connector on one end, unterminated on the other. Total length: 350 mm
		1F-GR35S-02	—	○	○	○	○	Straight cable for 4-valve systems, robot connector on one end, unterminated on the other. Total length: 500 mm
③	Hand input cable	1S-HC30C-11	○	—	—	—	—	4-point type, with a robot connector on one side and unterminated on the other.
		1F-HC35S-02	—	○	○	○	○	8-point type, with a robot connector on one side and unterminated on the other. Total length: 1000 mm
④	Hand curl tube	1E-ST040mC	○	○	○	○	—	For 1- to 4-Φ4-valve systems; total length: 630 mm (including 180 mm curled section) m indicates No. of tubes (2, 4, 6 or 8), 2 or 4 only in the RV-2FR and RV-2FRL
		1N-ST060mC	—	—	—	—	○	For 1- to 4-Φ6-valve systems; total length: 1150 mm (including 250 mm curled section) m indicates No. of tubes (2, 4, 6 or 8)
⑤	Forearm external wiring set 1	1F-HB01S-01	—	○	○	○	○	For the forearm. External wiring box used for connecting the gripper input cable, Ethernet cable and the electric gripper and force sensor cable.
	Forearm external wiring set 2	1F-HB02S-01	—	○	○	○	○	For the forearm. External wiring box used for connecting the force sensor, electric gripper and Ethernet cable.
⑥	Base external wiring set 1	1F-HA01S-01	—	○	○	○	○	For the base. External wiring box used for connecting the electric gripper communications output, electric gripper and force sensor cable and Ethernet cable. Includes gripper input.
	Base external wiring set 2	1F-HA02S-01	—	○	○	○	○	For the base. External wiring box used for connecting the electric gripper communications output, electric gripper, force sensor and Ethernet cable. No gripper input.
⑦	Machine cable (replacement) (fixed)	1F-mmUCBL-41	○	○	○	○	○	Replacement type, 2, 10, 15 or 20 mm mm indicates cable length (02, 10, 15 or 20 m)
	Machine cable (replacement) (flexible)	1F-mmLUCBL-41	○	○	○	○	○	Replacement type, 10, 15 or 20 mm mm indicates cable length (10, 15 or 20 m)
⑧	J1 axis movement range modification	1S-DH-11J1	○	—	—	—	—	Stopper for changing the range, installed by customer
		1F-DH-05J1	—	—	—	○	○	Stopper for changing the range, installed by customer (Also compatible with RV-7FRLL)
		1F-DH-04	—	—	○	—	—	Stopper for changing the range, installed by customer
		1F-DH-03	—	○	—	—	—	Stopper for changing the range, installed by customer
	J2 axis movement range modification	1S-DH-11J2	○	—	—	—	—	Stopper for changing the range, installed by customer
J3 axis movement range modification	1S-DH-11J3	○	—	—	—	—	Stopper for changing the range, installed by customer	

RV-4FR/7FR/13FR/20FR series tooling machine configurations

The required options differ depending on the gripper (tool) configuration. The table below lists the "Forearm external wiring sets" and "Base external wiring sets" required for the different gripper configurations. Select wiring sets accordingly.

Gripper configuration	Wiring mode	Body specifications	Required equipment		Comment
			Forearm external wiring set	Base external wiring set (*3)	
•Pneumatic gripper + gripper input signals	Internal	-SH01	— (*1)	—	Air tubes: Up to 2 sets (Φ4 × 4), 8 input signals
	External	Standard	— (*2)	—	Air tubes: Up to 4 sets (Φ4 × 8)
•Pneumatic gripper + gripper input signals •Vision sensor	Internal	-SH05	— (*1)	(1F-HA01S-01)	Air tubes: Up to 1 set (Φ4 × 2), 8 input signals
	External	Standard	1F-HB01S-01 (*2)	1F-HA01S-01	Air tubes: Up to 4 sets (Φ4 × 8)
•Pneumatic gripper + gripper input signals •Force sensor	Internal	-SH04	— (*1)	(1F-HA01S-01)	Air tubes: Up to 1 set (Φ4 × 2), 8 input signals
	External	Standard	1F-HB01S-01 (*2)	1F-HA01S-01	Air tubes: Up to 4 sets (Φ4 × 8)
•Pneumatic gripper + gripper input signals •Vision sensor •Force sensor	Internal (External air tubes)	-SH02	— (*1)	(1F-HA01S-01)	External air tubes: Up to 4 sets (Φ4 × 8)
	External	Standard	1F-HB01S-01	1F-HA01S-01	Air tubes: Up to 4 sets (Φ4 × 8)
•Electric gripper + gripper input signals •Vision sensor	Internal	-SH02	—	(1F-HA01S-01)	
	External	Standard	1F-HB01S-01	1F-HA01S-01	
•Electric gripper •Vision sensor •Force sensor	Internal	-SH03	—	(1F-HA02S-01)	
	External	Standard	1F-HB02S-01	1F-HA02S-01	

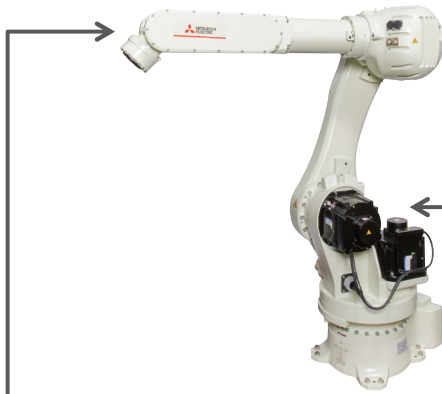
*1: For pneumatic grippers with internal wiring, solenoid valves should be provided.

*2: For pneumatic grippers with external wiring, solenoid valves, tubing and input cables, etc. should be provided as necessary.

*3: For machines with internal wiring and tubing, a base external wiring set is included with the machine and does not need to be provided separately.

OPTIONS

Robot arm options(RV-35FR/50FR/80FR)



Machine cable (standard)

Fixed 7m



Machine cable (replacement)

Fixed 12,17or22m

Flexible 7,12,17 or 22m

④

Hand input cable

Cable for connection to hand open/close sensors,etc.

①



Hand output cable

Cable for connection to hand open/close sensors,etc.

②



Hand Ethernet cable

The customer should use this cable to connect a camera.

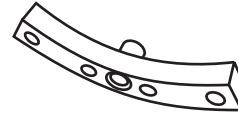
③



Operating range change stopper

The customer should install the optional stopper

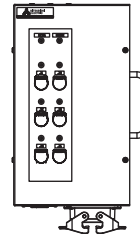
⑤



Breake releasing device

The brakes of the robot arm can be released without connecting a controller in emergency

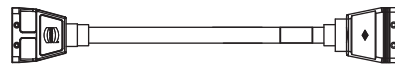
⑥



Power cable for the breake

This cable is used to connect between the breake releasing device and the robot arm and to supply brakepower to the robot.

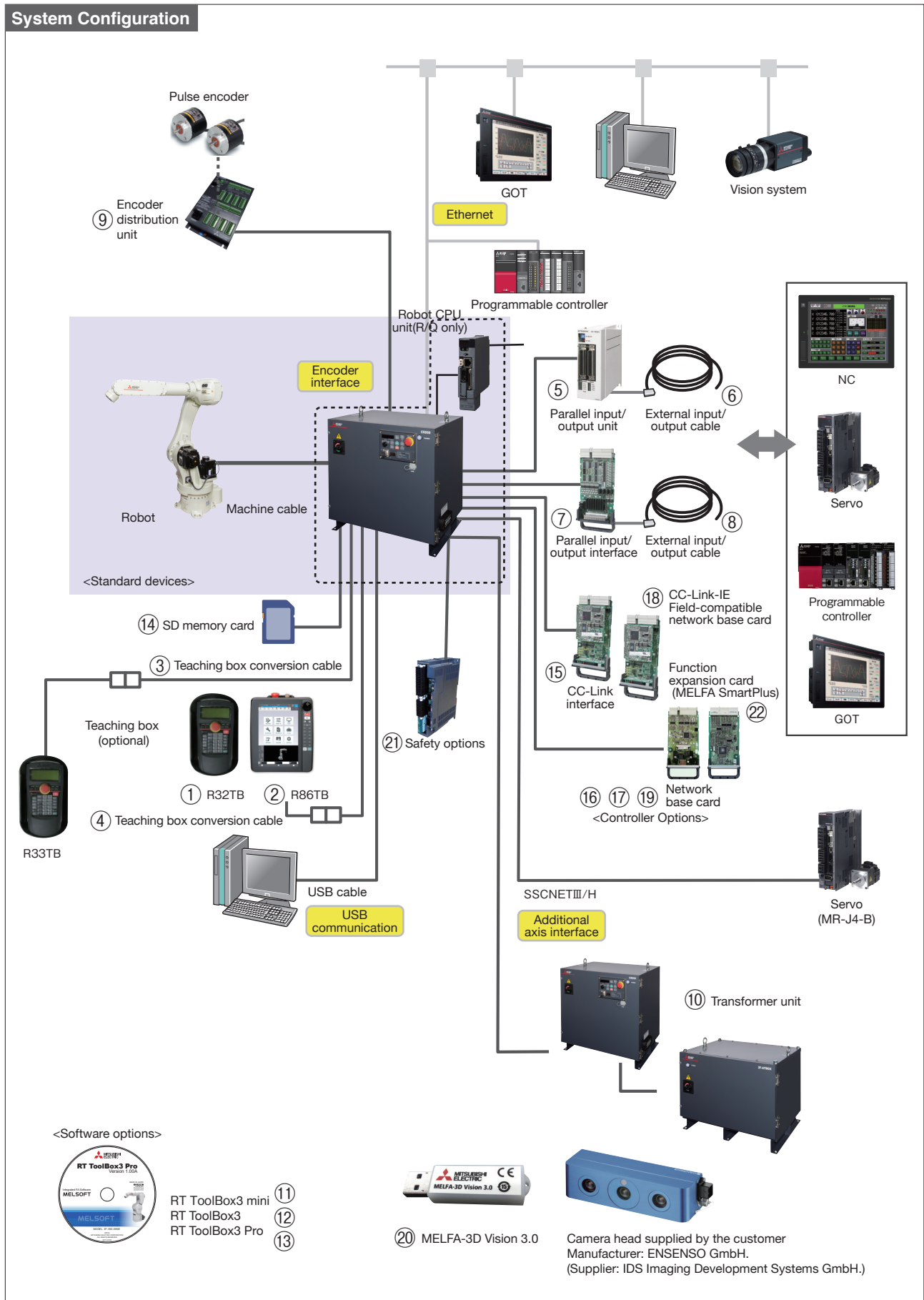
⑦



SYSTEM

CR860 Controller

System Configuration



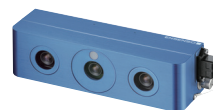
<Software options>



RT ToolBox3 mini (11)
RT ToolBox3 (12)
RT ToolBox3 Pro (13)



(20) MELFA-3D Vision 3.0



Camera head supplied by the customer
Manufacturer: ENSENSO GmbH.
(Supplier: IDS Imaging Development Systems GmbH.)

OPTIONS (CR860 Controller)

Optional Configuration (Controllers)

No.	Name	Model	Specifications
①	Simple teaching box (7, 15 m)	R32TB(-**)	7 m: Standard; 15 m: Special (model name includes "-15")
②	High-performance teaching box (7m)	R86TB	7 m: Standard If 7m is not enough, use a teaching box extension cable
③	Teaching box conversion cable (33→32)	2F-33CON03M	Conversion cable for connecting the CR800 controller to the R33TB/R57TB. Cable length: 3m
④	Teaching box extension cable	2F-32EXTBST-**M	** is the cable length. (01, 05, 10, 15m)
⑤	Parallel input/output unit	(Sink type)	2A-RZ361
		(Source type)	2A-RZ371
⑥	External input/output cable (5, 15 m)	2A-CBL**v	CBL05: 5 m; CBL15: 15 m, one end unterminated For 2A-RZ361/371
⑦	Parallel input/output interface (built-in)	(Sink type)	2D-TZ368
		(Source type)	2D-TZ378
⑧	External input/output cable (5, 15 m)	2D-CBL**	CBL05: 5 m; CBL15: 15 m, one end unterminated For 2D-TZ368/378
⑨	Encoder distribution unit	2F-YZ581	Unit used for connecting multiple controllers to one rotary encoder when using the tracking function (for 4 robots)
⑩	Transformer unit	2F-ATBOX	The robot can be used with a 400V power supply.
⑪	Computer support software mini version	3F-15C-WINE	Simplified version (DVD-ROM), (RT ToolBox3 mini)
⑫	Computer support software	3F-14C-WINE	With simulation function (DVD-ROM), (RT ToolBox3)
⑬	Computer support software Pro version	3F-16D-WINE	Professional version (DVD-ROM), (RT ToolBox3 Pro)
⑭	SD memory card	2F-2GBSD	2 GB, logging
⑮	CC-Link interface	2D-TZ576	CC-Link intelligent device station Ver. 2.0, for 1-4 stations
⑯	Network base card (Ethernet/IP interface)	2D-TZ535	Communications interface for installation in an HMS Anybus-CompactCom module. HMS Ethernet/IP module (AB6314-B-218) to be provided by the customer.
⑰	Network base card (PROFINET interface)	2D-TZ535-PN	Communications interface for installation in an HMS Anybus-CompactCom module. HMS PROFINET IO module (AB6489-B) to be provided by the customer.
⑱	Network base card (CC-Link-IE Field interface)	2F-DQ535	Communications interface for installation in an HMS Anybus-CompactCom module. HMS CC-Link-IE Field module (AB6709-B-116) to be provided by the customer.
⑲	Network base card (EtherCAT interface)	2F-DQ535-EC	Communications interface for installation in an HMS Anybus-CompactCom module. HMS EtherCAT module (AB6607-D-224) to be provided by the customer.

Optional Configurations (Functions)

No.	Name	Model	Specifications
⑳	MELFA-3D Vision 3.0	3F-53U-WINM	MELFA-3D Vision software
㉑	Safety option	4F-SF003-05	Devices required by the safety functions

Option Configurations (Software Expansion Functions)

No.	Name	Model	Specifications
㉒	MELFA Smart Plus Card Pack	2F-DQ510	Enables all A-type functions
		2F-DQ520	Enables all A and B-type functions
	MELFA Smart Plus Card	2F-DQ511	Selects and enables one function from the A-type functions
		2F-DQ521	Selects and enables one function from the A and B-type functions

Classification	Name	Type	Function outline
Intelligent function	Calibration assistance function	A	Assists positional calibration with peripheral devices using 2D vision sensors.
	Automatic calibration		Improves positioning accuracy by automatically correcting the vision sensor coordinates.
	Work coordinate calibration		Improves positioning accuracy by correcting the robot coordinates and work coordinates from the vision sensor.
	Inter-robot relational calibration		Uses vision sensors to adjust the relative locations of multiple robots. Improves positioning accuracy during coordinated operation.
	2D vision sensor enhancement function	A	Various vision applications are used to facilitate vision alignment.
	Robot mechanism thermal compensation function	A	Improves positioning accuracy by compensating for thermal expansion in the robot arm.
	Coordinated control for additional axis	A	Function for highly accurate coordination (interpolation) with additional axis (straight coaxial)
AI function	MELFA 3D Vision enhancement function	B	Automates 3D vision sensor parameter adjustment work, and improves measurement and recognition performance using AI technology. * Compatible with robot controller Version A3 or later.
	Enhancement function for force sense control	B	Utilizes AI technology to perform repeated learning in a short time period to calculate the optimal insertion pattern. * Compatible with robot controller Version A4 or later.