Single axis

RDV-X/RDV-P

● Robot driver   ● Only for pulse train control

RDV-X   **RDV-P**

As the size is small and weight is light, it is easy to use in automated machinery.

Features

1 Dedicated pulse train control

The dedicated pulse train control has achieved a compact body and a low price.

2 Position setting time reduced by 40%

The response frequency is enhanced about two times in comparison with former models. The position setting time of uniaxial robots is reduced by about 40%. [Note 1]

3 Large cost reduction possible

It is easy to assemble them in automated machinery. You can save much labor in designing, parts selection, setting and more. A large cost reduction is possible.

4 Contributing to saving space for the whole control board

The compact design has reduced the width up to a maximum of 38% in comparison with former models. In addition, the improvement of radiation efficiency makes it possible to arrange the devices with less space in between. Multiple units can be installed side by side in a neat arrangement.

5 Easy replacement

The parameter settings and fastening-hole pitches are the same as those of former models. It is easy to replace the software and the hardware as well.

6 Command input: Line driver (2 Mpps)

7 Command output: ABZ-phase output (with a divider function)

8 Real-time operation status monitoring

You can have analog outputs for speed, amperage, and more information to know the operation status in real time. RDV-Manager, the dedicated support software, is also available for a graphical view of the status.

9 Main power: Single and three phases supported (200V)

The full-specification operation is available with a single-phase power supply.

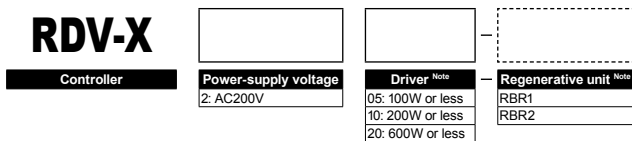Note 1. With a 400W servomotor, 20mm ball screw lead, and portability of 40kg.

■ Model Overview

Name	RDV-X	RDV-P
Power	● Main power supply Single phase / 3-phase 200 to 230V +10% to -15% (50/60Hz +/-5%) ● Control power supply Single phase 200 to 230V +10% to -15% (50/60Hz +/-5%)	
Operating method	Pulse train control	
Maximum number of controllable axes	Single-axis	
Position detection method	Incremental	
Controllable robot	Single-axis robot FLIP-X [Note1]	Linear motor single-axis robot PHASER
Support software for PC	RDV-Manager	

Note 1. Exclude T4 / T5 / C4 / C5 / YMS

■ Ordering method

● RDV-X

RDV-X

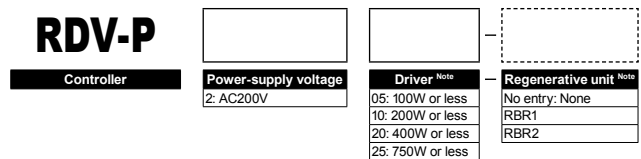| Controller	Power-supply voltage	Driver [Note]	–	Regenerative unit [Note]
	2: AC200V	05: 100W or less 10: 200W or less 20: 600W or less		RBR1 RBR2

Note. Driver selection and regenerative unit selection depend on the robot type.
See the selection table on the next page for selecting the driver/regenerative circuit.

● RDV-P

RDV-P

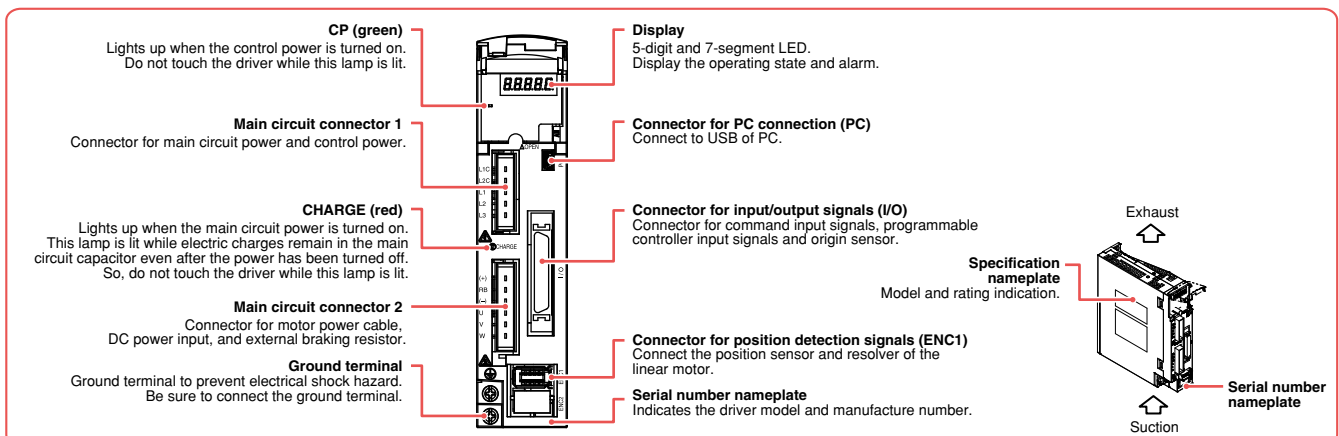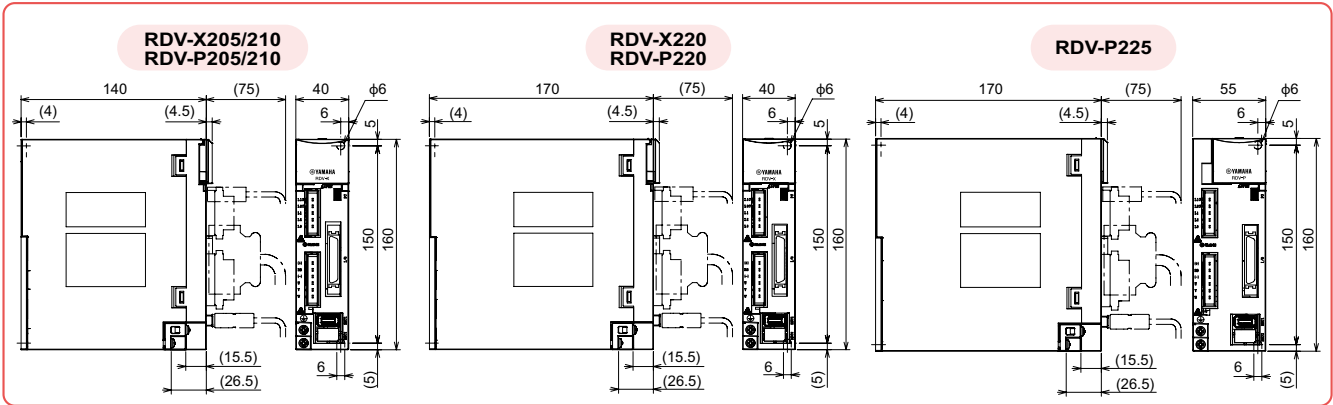| Controller	Power-supply voltage	Driver [Note]	–	Regenerative unit [Note]
	2: AC200V	05: 100W or less 10: 200W or less 20: 400W or less 25: 750W or less		No entry: None RBR1 RBR2

Note. Driver selection and regenerative unit selection depend on the robot type.
See the selection table on the next page for selecting the driver/regenerative circuit.

■ Part names

CP (green)
Lights up when the control power is turned on.
Do not touch the driver while this lamp is lit.

Main circuit connector 1
Connector for main circuit power and control power.

CHARGE (red)
Lights up when the main circuit power is turned on.
This lamp is lit while electric charges remain in the main circuit capacitor even after the power has been turned off.
So, do not touch the driver while this lamp is lit.

Main circuit connector 2
Connector for motor power cable, DC power input, and external braking resistor.

Ground terminal
Ground terminal to prevent electrical shock hazard.
Be sure to connect the ground terminal.

Display
5-digit and 7-segment LED.
Display the operating state and alarm.

Connector for PC connection (PC)
Connect to USB of PC.

Connector for input/output signals (I/O)
Connector for command input signals, programmable controller input signals and origin sensor.

Connector for position detection signals (ENC1)
Connect the position sensor and resolver of the linear motor.

Serial number nameplate
Indicates the driver model and manufacture number.

Exhaust

Specification nameplate
Model and rating indication.

Serial number nameplate

Suction

■ Dimensions

RDV-X205/210 / RDV-P205/210

RDV-X220 / RDV-P220

RDV-P225

■ Driver / regenerative unit selection table

● RDV-X

			FLIP-X																											
			T4LH/C4LH	T5LH/C5LH	T6L/C6L	T9	T9H	F8/C8	F8L/C8L	F8LH/C8LH	F10/C10	F14/C14	F14H/C14H	GF14XL	F17/C17	F17L/C17L	GF17XL	F20/C20	F20N	N15	N18	N15D	N18D	B10	B14	B14H	R5	R10	R20
Driver selection	RDV-X	05	●	●	●	●		●	●	●	●	●												●	●		●	●	
		10					●						●													●			●
		20												●	●	●	●	●	●	●	●	●	●						
Regenerative unit	No entry (None)		●	●																									
	RBR1				●	●	●	●	●	●	●	●	●	●	❶	❶	●	❶	●	●	●	●	●	●	●	●	●	●	●
	RBR2														❶	❶		❶											

❶ If placed horizontally the RBR1 is required, if placed vertically then RBR2 is required.

● RDV-P

			PHASER					
			MR12/MR12D	MF7/MF7D	MF15/MF15D	MF20/MF20D	MF30/MF30D	MF75/MF75D
Driver selection	RDV-P	05	●					
		10		●	●	●		
		20					●	
		25						●
Regenerative unit	No entry (None)		●					
	RBR1			●	●	●	●	
	RBR2							●

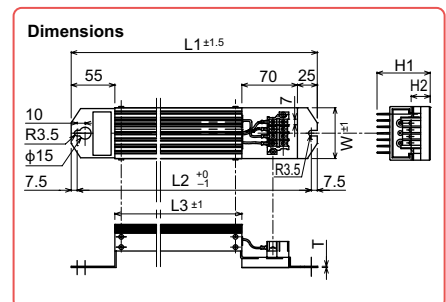## ■ Regenerative unit RBR1 / RBR2 dimensions

The regenerative unit is a device that converts the braking current generated when the motor decelerates into heat.
Regenerative unit is required for specified Yamaha models and for operation with loads having large inertia.

● Regenerative unit RBR1

Dimensions

● Regenerative unit RBR2

Dimensions

■ Regenerative unit RBR1 / RBR2 basic specifications

Item	RBR1	RBR2
Model	KBH-M5850-00	KBH-M5850-10
Capacity type	120W	200W
Resistance value	100Ω	100Ω
Permissible braking frequency	2.5%	7.5%
Permissible continuous braking time	12 sec.	30 sec.
Weight	0.27kg	0.97kg

Note. The internal thermal contact point capacity is AC250V, 2A max. ON (b contact point) in the normal state.
Note. The built-in thermal fuse prevents abnormal heat generation which occurs by an erroneous use. (not resettable)
Note. When the thermal relay has worked, reduce the regeneration energy by either stopping the servo amplifier or making the deceleration time longer.
Note. With the regenerative unit, specifications and whether or not required may vary depending on each robot and its operation conditions.

RDV-X/RDV-P

■ Basic specifications

Item / Model	RDV-X			RDV-P			
Driver model	RDV-X205	RDV-X210	RDV-X220	RDV-P205	RDV-P210	RDV-P220	RDV-P225
Number of controllable axes	Single-axis						
Controllable robots	Single-axis robot FLIP-X			Linear motor single-axis robot PHASER			
Basic specifications Capacity of the connected motor	200V 100W or less	200V 200W or less	200V 600W or less	200V 100W or less	200V 200W or less	200V 400W or less	200V 750W or less
Maximum power consumption	0.3kVA	0.5kVA	0.9kVA	0.3kVA	0.5kVA	0.9kVA	1.3kVA
Dimensions	W40×H160×D140mm		W40×H160×D170mm	W40×H160×D140mm		W40×H160×D170mm	W55×H160×D170mm
Weight	0.7kg		1.1kg	0.7kg		1.1kg	1.2kg
Input power supply — Control power supply	Single phase 200 to 230V +10%, -15%, 50/60Hz +/-5%						
Input power supply — Motor power supply	Single phase / 3-phase 200 to 230V +10%, -15%, 50/60Hz +/-5%						
Axis control Position detection method	Resolver			Magnetic linear scale			
Control system	Sine-wave PWM (pulse width modulation)						
Control mode	Position control						
Maximum speed Note 1	5000rpm			3.0m/s			
Input/output related function Position command input	Line driver signal (2M pps or less) (1) Forward pulse + reverse pulse (2) Sign pulse + Command pulse (3) 90-degree phase difference 2-phase pulse command One of (1) to (3) is selectable.						
Input signal	24V DC contact point signal input (usable for sink/source) (24V DC power supply incorporated) (1) Servo ON (2) Alarm reset (3) Torque limit (4) Forward overtravel (5) Reverse overtravel (6) Origin sensor Note 3 (7) Return-to-origin (8) Pulse train input enable (9) Deviation counter clear						
Output signal	Open collector signal output (usable for sink/source) (1) Servo ready (2) Alarm (3) Positioning completed (4) Return-to-origin complete						
Relay output signal	Braking cancel signal (24V 375mA)			-			
Position output	Phase A, B signal output: Line driver signal output Phase Z signal output: Line driver signal output / open collector signal output N/8192 (N=1 to 8191), 1/N (N=1 to 64) or 2/N (N=3 to 64)						
Monitor output	Selectable items: 2ch, 0 to +/-5V voltage output, speed detection value, torque command, etc.						
Internal function Display	5-digit number indicator, Control power LED						
External operator	PC software "RDV-Manager" monitoring function, parameter setting function, operation tracing function, trial operation function, etc. USB2.0 is used. Windows Vista / 7 / 8 / 8.1 personal computer can be connected.						
Regenerative braking circuit	Included (but without braking resistor)						
Dynamic brake Note 4	Included (Operation conditions can be set.) (No DB resistor, connection: 2-phase short circuit)						Included (Operation conditions can be set.) (with DB resistor, connection: 2-phase short circuit)
Protective function Note 2	Semi-enclosure type (IP20)						
Protective functions	Over-current, overload, braking resistor overload, main circuit overvoltage, memory error, etc.						
Options Support software for PC	RDV-Manager						
General specifications Operating temperature	0°C to +55°C						
Storage temperature Note 5	-10°C to +70°C						
Operating humidity	20% to 90%RH (non-condensing)						
Vibration Note 6	5.9m/s^2 (0.6G) 10 to 55Hz						

Note 1. These data are parameters and calculation range in controlling the robot driver and do not indicate the capacity of the robot at the maximum speed.
Note 2. JIS C 0920 (IEC60529) is used as the base for the protection method.
Note 3. GXL-8FB (made by SUNX) or FL7M-1P5B6-Z (made by YAMATAKE) is used for the origin sensor. The power consumption of the origin sensor is 15mA or less (at open output) and only 1 unit of the origin sensor is connected to each robot driver. (future specification)
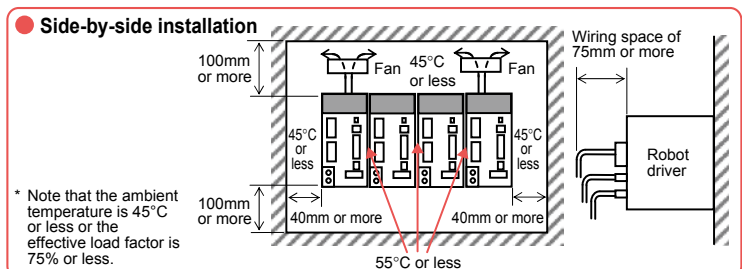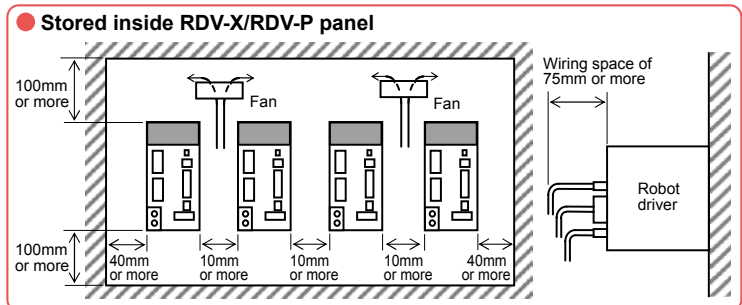Note 4. Use the dynamic brake for emergency stop. Note that the braking may be less effective depending on the robot model.
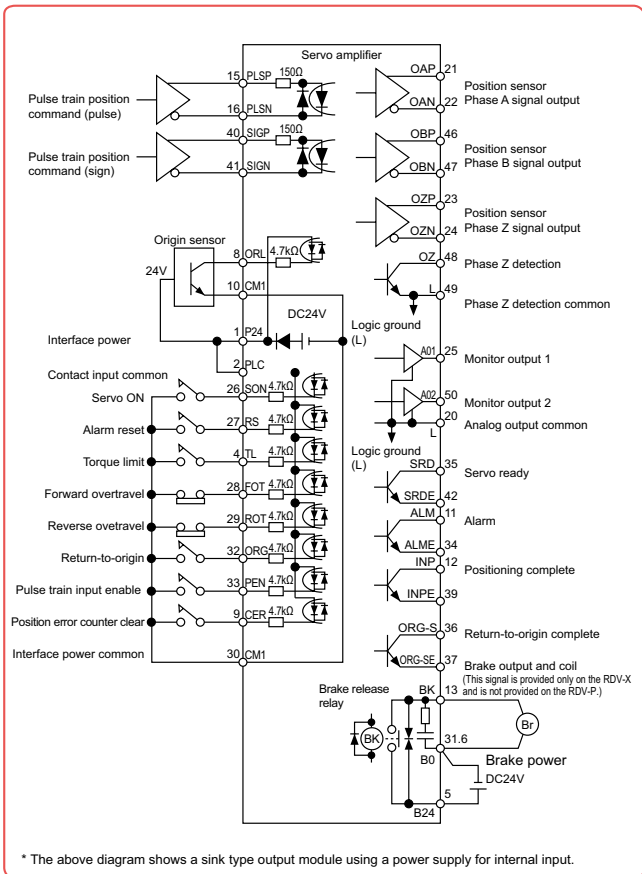Note 5. The storage temperature is the temperature in the non-energized state including transportation.
Note 6. The JIS C 60068-2-6:2010 (IEC 60068-2-6:2007) test method is uses as the base.

■ Installation conditions

- Install the RDV-X/RDV-P on a vertical metal wall.
- Install the RDV-X/RDV-P in a well ventilated location, with space on all sides of the RDV-X/RDV-P.
- Ambient temperature : 0 to 55°C
- Ambient humidity : 20 to 90% RH (no condensation)
- When placing two or more robot drivers in one operating panel, install them as shown in the figure on the right.

● **Stored inside RDV-X/RDV-P panel**

100mm or more
Fan   Fan
Wiring space of 75mm or more
Robot driver
100mm or more
40mm or more   10mm or more   10mm or more   10mm or more   40mm or more

● **Side-by-side installation**

100mm or more
Fan   45°C or less   Fan
Wiring space of 75mm or more
45°C or less   45°C or less
Robot driver
* Note that the ambient temperature is 45°C or less or the effective load factor is 75% or less.
100mm or more   40mm or more   40mm or more
55°C or less

Input / output signal connection diagram

* The above diagram shows a sink type output module using a power supply for internal input.

List of RDV-P / RDV-X terminal functions

Type	Terminal symbol	Terminal name	Description
Input signal	P24	Interface power	Supplies 24V DC for contact inputs. Connecting this signal to the PLC terminal allows using the internal power supply. Use this terminal only for contact input. Do not use for controlling external equipment connected to the driver, such as brakes.
	CM1	Interface power common	This is a ground signal for the power supply connected to P24. If using the internal power supply then input a contact signal between this signal and the contact-point signal.
	PLC	Intelligent input common	Connect this signal to the power supply common contact input. Connect an external supply or internal power supply (P24).
	SON	Servo ON	Setting this signal to ON turns the servo on (supplies power to motor to control it). Additionally, this signal is also used for estimating magnetic pole position when FA-90 is set to oFF4, oFF5.
	RS	Alarm reset	After an alarm has tripped, inputting this signal cancels the alarm. But before inputting this reset signal, first set the SON terminal to OFF and eliminate the cause of the trouble.
	TL	Torque limit	When this signal is ON, the torque limit is enabled.
	FOT	Forward overtravel	When this signal is OFF, the robot will not run in forward direction. (Forward direction limit signal)
	ROT	Reverse overtravel	When this signal is OFF, the robot will not run in reverse direction. (Reverse direction limit signal)
	ORL	Origin sensor	Input an origin limit switch signal showing the origin area.
	ORG	Return-to-origin	Inputting this signal starts return-to-origin operation.
	PEN	Pulse train input enable	When this signal is turned on, the pulse train position command input is enabled.
	CER	Position error counter clear	Inputting this signal clears the position deviation (position error) counter. (Position command value is viewed as current position.)
Output signal	SRD SRDE	Servo ready	This signal is output when the servo is ready to turn on (with main power supply turned on and no alarms tripped)
	ALM ALME	Alarm	This signal is output when an alarm has tripped. (This signal is ON in normal state and OFF when an alarm has tripped.)
	INP INPE	Positioning complete	This signal is output when the deviation between the command position and current position is within the preset positioning range.
	ORG-S ORG-SE	Return-to-origin complete	This signal is output when the return-to-origin is completed successfully.
Relay output	BK (B24)[Note 1]	Brake release relay output	When the servo is ON, this terminal outputs a signal to allow releasing the brake. (FLIP-X series only)
Monitor output	AO1	Monitor output 1	Outputs speed detection values, torque commands, etc. as analog signal voltages for monitoring. Signals to output are selected by setting parameters. These signals are only for monitoring. Do not use for control.
	AO2	Monitor output 2	
	L	Monitor output common	This is the ground for the monitor signal.
Position command	PLSP PLSN	Position command pulse (pulse signal)	Select one of the following signal forms as the pulse-train position command input. 1. Command pulse + direction signal 2. Forward direction pulse train + reverse direction pulse train 3. Phase difference 2-phase pulse
	SIGP SIGN	Position command pulse (sign signal)	
Position sensor monitor	OAP OAN	Position sensor Phase A signal	Outputs monitor signal obtained by dividing "phase A" signal of position sensor.
	OBP OBN	Position sensor Phase B signal	Outputs monitor signal obtained by dividing "phase B" signal of position sensor.
	OZP OZN	Position sensor Phase Z signal	Outputs monitor signal for position sensor "phase Z" signal.
	OZ	Phase Z detection	Outputs monitor signal for position sensor "phase Z" signal.
	L	Phase Z detection common	
Braking power input	B24 [Note 1]	Brake power input	Input 24V DC brake power to this terminal.
	B0 [Note 1]	Brake power common	Common terminal input for brake power.

Note 1. B24, BO and BK are available only with RDV-X, and not with RDV-P.

Standard accessories

I/O connector (no brake wiring)

Model	KBH-M4420-00

I/O connector (with brake wiring)

Model	KBH-M4421-00

Power supply connector

Model	KEF-M4422-00

RDV-X/RDV-P
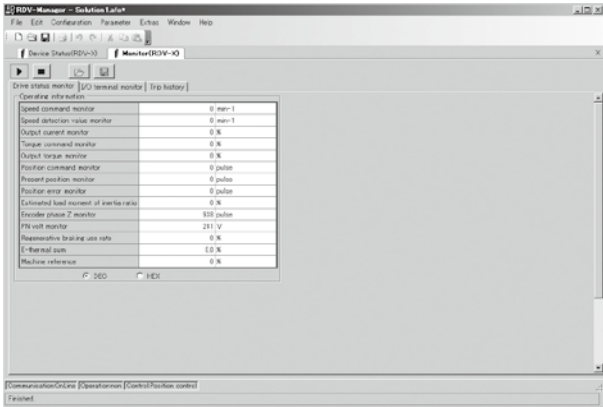
Support software for PC

RDV-Manager Configuration Software

RDV-Manager is software for RDV-X/RDV-P. Using the Windows operating computer, it is possible to set parameters, to monitor the position, speed and torque and to have graphics displayed, assuring pleasant and easy operation in the Windows Vista, Windows 7 or Windows 8 / Windows 8.1 environment.
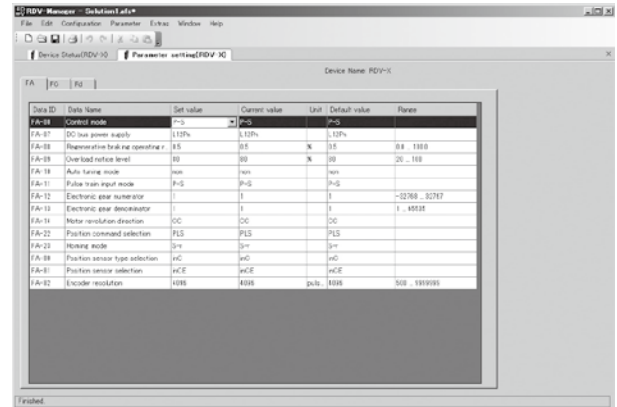
■ Features

1 Monitoring function

It is possible to monitor the operation condition and output state in real time. Additionally, the terminal can be operated forcibly to check the operation.
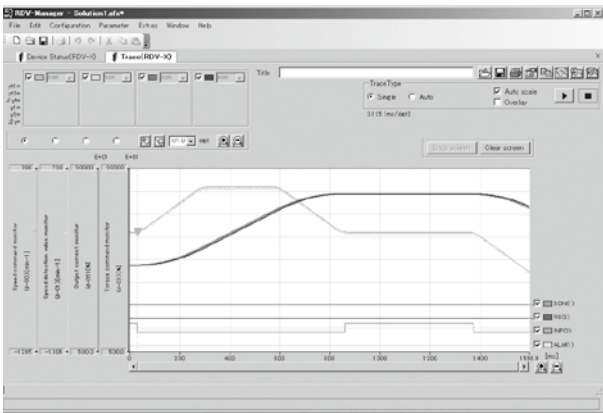

2 Setting parameters

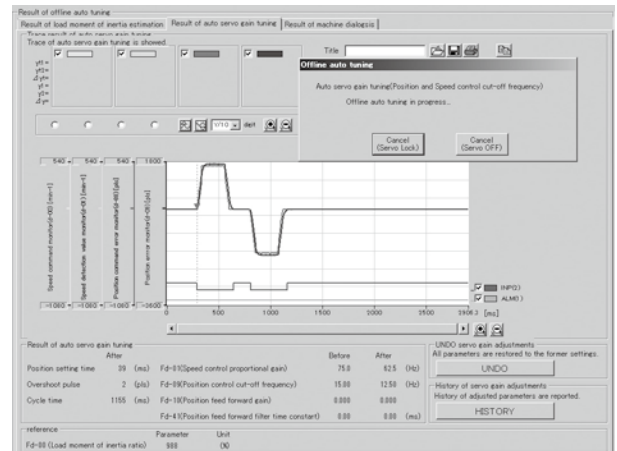It is possible to set, change, print and store the parameters.

3 Operation tracing function

It is possible to have the servo motor speed and electric current displayed in the form of graphics.

4 Offline auto tuning function

The load moment of inertia can be estimated and the automatic servo gain can be adjusted.

■ Communication cable for PC supporting software RDV-Manager (3m)

Communication cable to connect PC and a controller.

Model	KEF-M538F-00

■ Support software RDV-Manager

RDV-Manager is RDV-X / RDV-P dedicated software.

Model	KEF-M4966-00

● Environment

OS	Microsoft Windows Vista(32bit) Note 1 / 7(32bit/64bit) / 8, 8.1(32bit/64bit)
CPU	Pentium4 1.8GHz or more (Recommend)
Memory	1GB or more
Hard disk	1GB of available space required on installation drive.
Disk operation	USB
Applicable controllers	RDV-X / RDV-P

Note 1. SP1 (service pack 1) or higher.
Note. Windows Vista, Windows 7, and Windows 8 / Windows 8.1 are trademarks of Microsoft Corporation registered in U.S.A. and other countries.