MITSUBISHI

LARGE CAPACITY INVERTER

12 Pulse Bridge Converter

MELTRAC-REC(MT-REC)

-INSTRUCTION MANUAL-

NOTICE : READ ENTIRE MANUAL PRIOP TO CONNECTING AND OPERATING EQUIPMENT

IB-T7237B

Thank you for choosing this Mitsubishi 12-Pulse Bridge Converter.
This instruction manual gives handling information and precaution for use of this equipment.
Incorrect handling might cause an unexpected fault. Before using the converter, please read this manual carefully to use the equipment to its optimum.
Please forward this manual to the end user.

This section is specifically about safety matters

Do not attempt to install, operate, maintain or inspect the converter until you have read through this instruction manual and appended documents carefully and can use the equipment correctly.
Do not use the converter until you have a full knowledge of the equipment, safety information and instructions.
In this instruction manual, the safety instruction levels are classified into "WARNING" and "CAUTION".

WARNING	Assumes that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
CAUTION	Assumes that incorrect handling may cause hazardous conditions, resulting in medium or slight injury, or may cause physical damage only.

Note that the CAUTION level may lead to a serious consequence according to conditions. Please follow the instructions of both levels because they are important to personnel safety.

SAFETY INSTRUCTIONS

1. Electric Shock Prevention

WARNING

- While power is on or when the converter is running, do not open the front cover. You may get an electric shock.
- Do not run the converter with the front cover removed. Otherwise, you may access the exposed high-voltage terminals or charging part of circuitry and get an electric shock.
- If power is off, do not remove the front cover except for wiring or periodic inspection. You may access the charged converter circuits and get an electric shock.
- Before starting wiring or inspection, switch power off, wait for more at least 10 minutes and check for the presence of any residual voltage with meter.
- Any person who is involved in the wiring or inspection of this equipment should be fully competent to do the work.
- Always install the converter before wiring. Otherwise, you may get an electric shock or be injured.
- Operate the switches with dry hands to prevent an electric shock.
- Do not subject the cables to scratches, excessive stress, heavy loads or pinching. Otherwise, you may get an electric shock.

2. Fire Prevention

CAUTION

- Mount the converter on an incombustible surface. Installing the converter directly on or near a combustible surface could lead to a fire.
- If the converter has become faulty, switch off the converter power. A continuous flow of large current could cause a fire.

3. Injury Prevention

CAUTION

- Apply only the voltage specified in the instruction manual to each terminal to prevent damage, etc.
- Ensure that the cables are connected to the correct terminals. Otherwise, damage, etc. may occur.
- Always make sure that polarity is correct to prevent damage, etc.
- After the converter has been operating for a relatively long period of time, do not touch the converter as it may be hot and you may get burnt.

4. Additional instructions

Also note the following points to prevent an accidental failure, injury, electric shock, etc.:

(1) Transportation and installation

⚠ CAUTION

- When carrying products, use correct lifting gear to prevent injury.
- Ensure that installation position and material can withstand the weight of the converter. Install according to the information in the Instruction Manual.
- Do not operate if the converter is damaged or has parts missing.
- Do not hold the converter by the front cover; it may fall off.
- Do not stand or rest heavy objects on the converter.
- Check the converter mounting orientation is correct.
- Prevent screws, wire fragments, conductive bodies, oil or other flammable substances from entering the converter.
- Do not drop the converter, or subject it to impact.
- Use the converter under the following environmental conditions:

Ambient temperature	-10°C to +50°C (14°F to 122°F) (non-freezing)
Ambient humidity	90%RH or less (non-condensing)
Storage temperature	-20°C to +65°C (-4°F to 149°F)
Ambience	Indoors (free from corrosive gas, flammable gas, oil mist, dust and dirt)
Altitude, vibration	Below 1000m, 5.9m/s^2{0.6G} or less

＊For transportation

Temperature	-20°C to 65°C (-4°F to 149°F)
Relative fumidity	90% or less
Air pressure	70kPa to 106kPa

(2) Wiring

⚠ CAUTION

- Connect the output cables P,P1 of the converter securely to the terminal P,P1 of the inverter.

(3) Operation

⚠ CAUTION

- Before running the converter which had been stored for a long period, always perform inspection and test operation.

(4) Disposing of the converter

⚠ CAUTION

- Treat as industrial waste.

(5) General instructions

Always replace the cover and follow this instruction manual when operating the converter.

Contents

1. Precaution

a. Install this option unit near inverter unit as possible.

b. While using this unit, DC reactor is not necessary.

c. 2 output type transformer is required for this option. Its specification is shown in chapter 2.2.

d. For using this option, inverter unit shall be needed small modification. Please check the model type MT-A140E-××K, FR-A540L-××K-R1

e. This option unit must be used for MT-A and FR-A500L series only. Don't combine other inverter.

f. Use terminal R1,S1 on inverter unit and connect control power supply to that terminal.

g. Consider cooling method for increasing of power loss by this option.

2. Standard specification

2.1 12-pulse bridge converter

Model : MT-REC-		H75K	H150K	H220K	H280K	H375K
Power supply capacity (kVA)	Inverter System(*1)	110	220	330	420	550
	MT-REC converter unit	55	110	165	210	275
Rated input current(A)	Inverter System	144	288	432	547	722
Input voltage/frequency (V) (*2)		3-phase 190 to 240V 50/60Hz				
Allowable voltage fluctuation (V) (*2)		162 to 264V 50/60Hz				
Allowable frequency (Hz)		5% (47.5Hz to 63Hz)				
Power supply voltage for cooling fans		1-phase 230V 50/60Hz				
Power supply capacity for cooling fans		18/16	36/32	54/48		
DC output current(A) (*1)		176	351	527	667	880
Overload current rating		120% 1min.				
Protection structure, cooling system		Open type(IP00), forced air cooling				
Approximate weight kg(lb.)		17(37.48)	21(46.30)	47(103.6)	47(103.6)	47(103.6)
Power loss(W) (*4)		350	700	1050	1300	1750
Protective function		Heat sink over-temperature				
Ambient temperature		-10°C to +50°C (14°F to 122°F) (non-freezing)				
Ambient humidity		90%RH or less (non-condensing)				
Storage temperature		-20°C to +65°C (-4°F to 149°F)				
Ambience		Indoors (free from corrosive gas, flammable gas, oil mist, dust and dirt)				
Attitude, vibration		Below 1000m, 5.9m/s^2{0.6G} or less				
Accessory		Cover for power terminal				

Note : *1. These values mean the requirement for input transformer capacity.
(Converter capacity is a half of these Inverter system capacity)
*2. Voltage rating is a half of standard inverter unit.
*3. Power loss of fans and input transformer is not included in these values.

2.2 Input transformer

MT-REC option requires input transformer for operation. Its specification is

Primary

winding method : Delta winding

Voltage : Standard voltage AC380-480V 50/60Hz

Capacity : Refer to power supply capacity on converter specification table

Secondary

winding method : Delta and Star winding (three phase, 2 output)

Voltage : Half of the standard inverter voltage

Capacity : Half of primary capacity on each winding

Impedance : 5 to 6% Primary-Secondary(Delta) based on Delta winding capacity.
5 to 6% Primary-Secondary(Star) based on Star winding capacity.

Exciting current : less than 0.4%

2.3 Combination table

Select 12-pulse converter and inverter in accordance with following table.

2.3.1 .1 MT-A100E and MT-REC for Constant Torque(CT) Application

Applicable motor(150%, 1min.OL Application)	12-Pulse Converter	Inverter
		Constant torque
75kW	MT-REC-H75K	MT-A140E-110K
90kW	MT-REC-H150K	MT-A140E-150K
110kW	MT-REC-H150K	MT-A140E-150K
132kW	MT-REC-H150K	MT-A140E-220K
150kW	MT-REC-H150K	MT-A140E-220K
160kW	MT-REC-H220K	MT-A140E-280K
220kW	MT-REC-H220K	MT-A140E-280K
280kW	MT-REC-H280K	MT-A140E-375K
375kW	MT-REC-H375K	-

2.3.1 .2 MT-A100E and MT-REC for Variable Torque(VT) Application

Applicable motor(120%, 1min. OL Application)	12-Pulse Converter	Inverter
		Variable torque
75kW	MT-REC-H75K	MT-A140E-75K
90kW	MT-REC-H150K	MT-A140E-110K
110kW	MT-REC-H150K	MT-A140E-110K
132kW	MT-REC-H150K	MT-A140E-150K
150kW	MT-REC-H150K	MT-A140E-150K
160kW	MT-REC-H220K	MT-A140E-220K
220kW	MT-REC-H220K	MT-A140E-220K
280kW	MT-REC-H280K	MT-A140E-280K
375kW	MT-REC-H375K	MT-A140E-375K

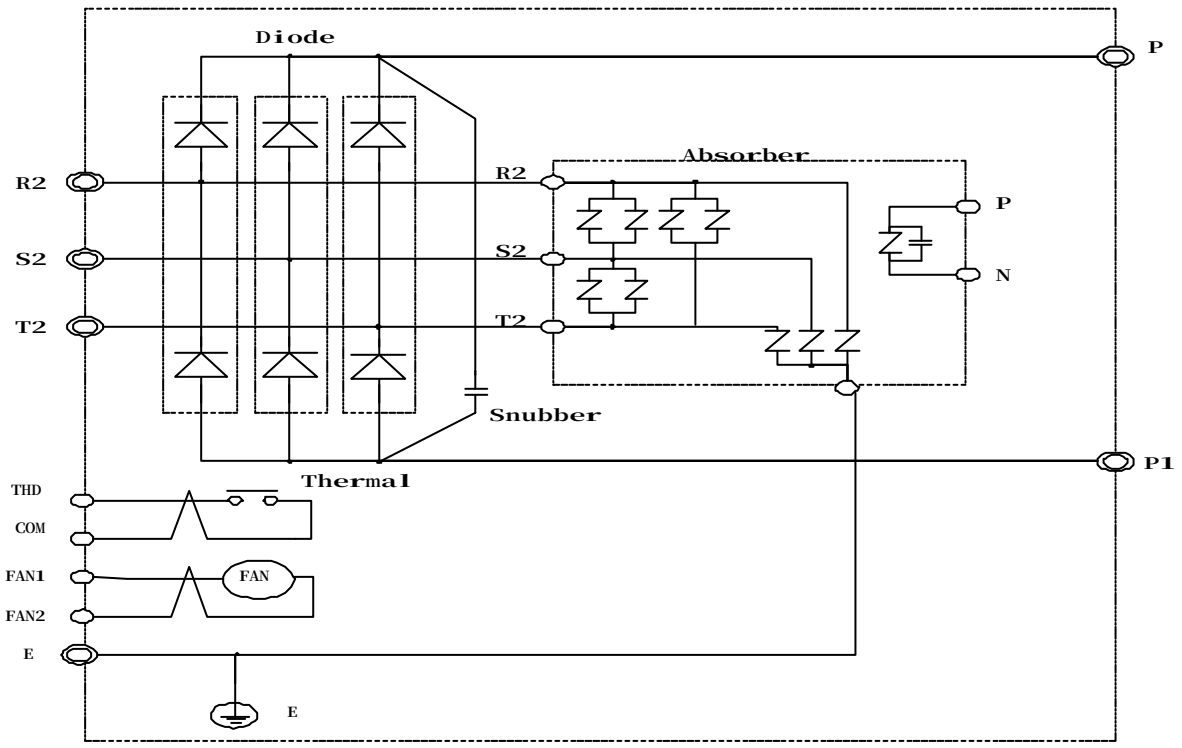
2.3.1 .3 FR-A500L and MT-REC for Constant Torque(CT) Application

Applicable motor(150%, 1min.OL Application)	12-Pulse Converter	Inverter
		Constant torque
75kW	MT-REC-H75K	FR-A540L-75K
90kW	MT-REC-H150K	FR-A540L-90K
110kW	MT-REC-H150K	FR-A540L-110K
132kW	MT-REC-H220K	FR-A540L-132K
150kW	MT-REC-H220K	FR-A540L-160K
160kW	MT-REC-H220K	FR-A540L-160K
185kW	MT-REC-H280K	FR-A540L-220K
220kW	MT-REC-H280K	FR-A540L-220K
280kW	MT-REC-H375K	FR-A540L-280K
375kW	MT-REC-H375K	-

2.3.1 .4 FR-A500L and MT-REC for Variable Torque(VT) Application

Applicable motor(120%, 1min. OL Application)	12-Pulse Converter	Inverter
		Variable torque
75kW	MT-REC-H75K	FR-A540L-75K
90kW	MT-REC-H150K	FR-A540L-75K
110kW	MT-REC-H150K	FR-A540L-75K
132kW	MT-REC-H150K	FR-A540L-90K
150kW	MT-REC-H150K	FR-A540L-110K
160kW	MT-REC-H220K	FR-A540L-132K
185kW	MT-REC-H220K	FR-A540L-132K
220kW	MT-REC-H220K	FR-A540L-160K
280kW	MT-REC-H280K	FR-A540L-220K
375kW	MT-REC-H375K	FR-A540L-280K

3. Circuit Diagram



4. Terminal

《 MT-REC 》

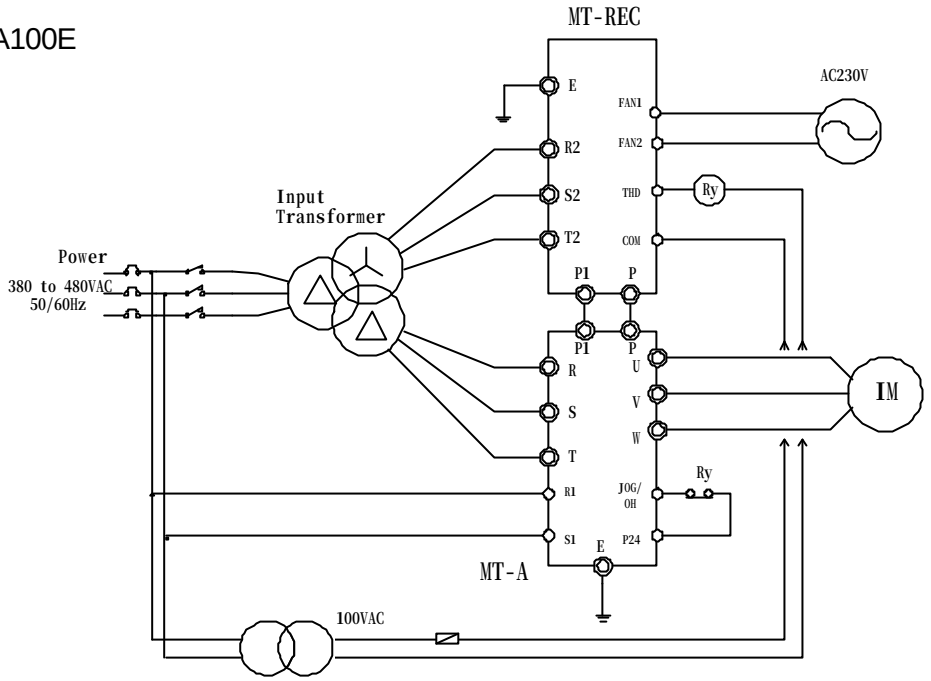
Terminal mark	Terminal name	Rating	Application
R2,S2,T2	AC power input terminal	3-phase 190-243V 50/60Hz	
P,P1	DC output terminal		The terminal shall be connected to the terminal P,P1 on inverter unit
E	Ground Terminal		Be sure to ground the circuit
THD,COM	Thermal output	Max.110V 0.3A 6W AC/DC	When the fin temperature will be over 100degree C, this terminal is closed.
FAN1,FAN2	Cooling fan power input terminal	AC 230V 50/60Hz	Be sure to connect to power source to protect the overheat of diode module.

《 INVERTER 》

Terminal mark	Terminal name	Rating	Application
R1,S1	AC power input terminal	3-phase 190-230V 50/60Hz	

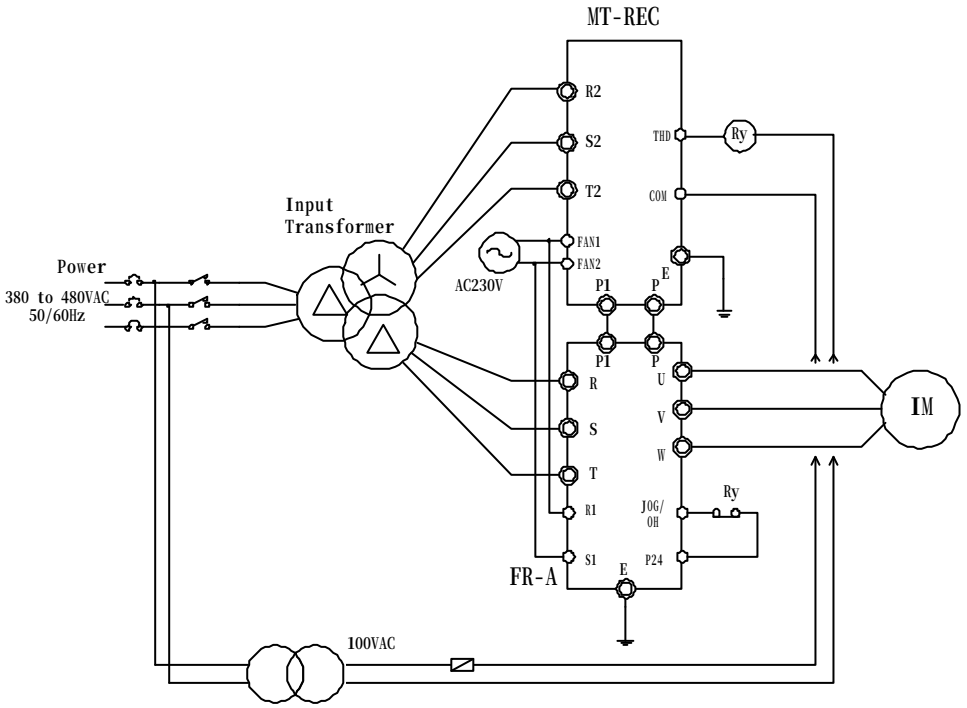
5. Connection diagram

5.1 MT-A100E



Note : Connect control power supply to terminal R1,S1 on inverter unit

5.2 FR-A500L



6. Outline