

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Visit our website - *Click HERE*

Instruction Manual (B)

STP Series Turbomolecular Pumps
STP-A2503/A3003 Series
Pump Specific Information

Model name	*Voltage*
STP-A2503/A3003 series	*200 - 240 Va.c.*



VIEW OUR INVENTORY

STP pump consists of the three-volumed Instruction Manuals.

Instruction Manual (A):	STP pump generic Instruction Manual
Instruction Manual (B): (This Instruction Manual)	**STP pump specific information**
Instruction Manual (C):	STP control unit Instruction Manual

EDWARDS

Copyright 2010 Edwards Japan Limited. All rights reserved. Printed in Japan.

The description of this product consists of the three-volumed Instruction Manuals. Read through each Instruction Manual before operation.
The separate volume contents of each description are as follows:

Instruction Manual (A)

STP pump generic Instruction Manual:

- Introduction
- Installation of the STP pump
- Installation of the STP control unit
- Operation
- Safety functions
- Maintenance and inspection
- Storage and disposal
- Service, Spares and accessories

Instruction Manual (B)

STP Pump specific information:

- Technical data
- How to Secure the STP pump
- Temperature Management System（TMS）

Instruction Manual (C)

STP control unit Instruction Manual:

- Introduction
- Technical data
- Installation
- Operation
- Serial communication protocol
- STP-Link (except for SCU-750)
- Maintenance
- Storage, transportation and disposal
- Service, spares, and accessories

Keep the manuals in an easily accessible location.

Declaration of Conformity

We,

Manufacture:	Edwards Japan Limited 1078-1, Yoshihashi, Yachiyo-shi, Chiba, 276-8523, Japan
EU Representative:	Edwards Limited Manor Royal, Crawley, West Sussex, RH10 9LW, UK

declare under our sole responsibility, as manufacturer and person within the EU authorised to assemble the technical file, that the product(s)

Product Name:	Turbomolecular pump
Model Number:	STP-A2503/A3003 series
Accessories Covered:	TMS Unit, Lon Communication Unit

to which this declaration relates is in conformity with the following standard(s) or other normative document(s)

EN1012-2:1996, A1:2009	Compressors and vacuum pumps - Safety requirements - Part 2: Vacuum pumps
EN61010-1:2001	Safety requirements for electrical equipment for measurement, control and laboratory Use. General requirements
EN61326-1:2006	Electrical equipment for measurement, control & laboratory Use. EMC requirements. General requirements (Immunity: Industrial locations, Emission: Class A)
EN61000-6-2:2005	Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments
EN61000-6-4:2007	Electromagnetic compatibility (EMC). Generic standards. Emission standard for industrial environments
EN55011:2007, A2:2007	Industrial, scientific and medical (ISM) radio-frequency equipment. Electromagnetic disturbance characteristics (Group1, Class A)

and fulfils all the relevant provisions of

2006/42/EC	Machinery Directive
2006/95/EC	Low Voltage Directive
2004/108/EC	Electromagnetic Compatibility (EMC) Directive
2002/95/EC*	Restriction of Certain Hazardous Substances (RoHS) Directive

** i.e. The product(s) contain less than - 0.1wt% for hexavalent chromium, lead, mercury, PBB and PBDE; 0.01wt% for cadmium - in homogeneous materials (subject to the exemptions allowed by the Directive). This information relates only to products sold on or after the date of this certificate. Edwards has taken all reasonable steps to confirm this statement, which is based mainly on information from our suppliers. Whilst the RoHS Directive does not legally apply to this vacuum equipment, we recognize that component compliance is relevant to many of our customers.*

Manufacture: Yuji Kato — *25th Dec. 2009, Yachiyo*

Yuji Kato, TMP Technical Senior Manager, Edwards Japan Limited — *Date and Place*

EU representative: — *30th Dec. 2009, Burgess Hill*

Barrie D Brewster, Technical Manager, Edwards Limited — *Date and Place*

This product has been manufactured under a quality system registered to ISO9001

VI-DOC-43-006

This page intentionally blank.

CONTENTS

Section	Title	Page
1	TECHNICAL DATA	1
1.1	Applicable pump specifications	1
1.1.1	STP pump specifications	2
1.1.2	Condition for the water-cooling unit	3
1.2	External appearance of the STP pump	4
1.3	Label affixing positions	6
1.4	Accessories	7
2	HOW TO SECURE THE STP PUMP	9
2.1	When securing the inlet port with bolts	10
2.2	When securing the inlet port flange with claw clamps	13
2.3	When installing the damper in the inlet port flange	14
3	TEMPERATURE MANAGEMENT SYSTEM (TMS)	15
3.1	Configuration of the STP pump with the TMS	15
3.2	TMS connection cable	16
3.3	TMS heater	16
3.4	TMS valve	16
3.5	TMS sensor cable	16
3.6	Installation of the TMS unit	17
3.6.1	Connecting the TMS connection cable to the STP control unit	17
3.6.2	Connecting the pump and TMS valve	17
3.6.3	Connecting TMS connection cable to STP pump	17
3.7	Condition for the TMS unit	18
3.8	Accessories	18

ILLUSTRATIONS

Figure	Title	Page
1	STP-A2503 series: VG250/ISO250F	4
2	STP-A3003 series: VG350/VG300/ISO320F	5
3	Label affixing positions for the STP pump	6
4	Example of securing the STP pump (when securing the inlet port with bolts)	11
5	Shape of reduced diameter shank bolts	12
6	Example of securing the STP pump (when securing the inlet port flange with claw clamps)	13
7	Example of securing the STP pump (when installing the damper in the inlet port flange)	14
8	Configuration of the STP pump with the TMS	15
9	External view of TMS connection cable	16

TABLES

Table	Title	Page
1	Tightening torque of bolt	9
2	Maximum torque predicted and recommended securing bolt for inlet port flange	10
3	Shape of reduced diameter shank bolts	12
4	Number of claw clamps for flange size	13

1 TECHNICAL DATA

1.1 Applicable pump specifications

Model Name	Specification	Applicable Control unit[*1]
STP-A2503/A3003 series	High-throughput type	SCU-1400/SCU-1500/SCU-1600

[*1] Applicable control unit: There are different performance specifications between SCU-1400, SCU-1500, and SCU-1600. Refer to Section 1.1.1, "STP pump specifications" for the differences.

Naming convention:

- "C" following a pump model name indicates a corrosion resistant[*2] type (e.g. STP-A2503C).
- "CV" indicates an enhanced corrosion resistant type with TMS[*3] (e.g. STP-A3003CV).

[*2] Corrosion resistant: STP pump with anti-corrosive treatment.

[*3] Temperature Management System: TMS unit (optional accessory) maintains the temperature at the base of the turbomolecular pump by monitoring the temperature with the temperature sensor in the base of the turbomolecular pump, and performing the TMS valve and base heater ON/OFF control.

1.1.1 STP pump specifications

The values shown below are typical. They are not guaranteed.

Item			A2503 series	A3003 series
Flange size	Inlet port flange		VG250/ISO250F/ ICF305	VG300/VG350/ ISO320F
	Outlet port flange		KF40	KF40
Pumping speed	N_2	L/s	2500	3000
	H_2	L/s	1600	1800
Compression ratio	N_2		$>10^8$	
	H_2		6×10^3	
Ultimate pressure		Pa (Torr)	10^{-6} (10^{-8}) order [after baking]	
Maximum gas flow-rate[*1]	N_2	Pa·m^3/s (SCCM)	3.0 (1800): Water cooling 1.5 (900): TMS unit is used (60 °C)	
	Ar	Pa·m^3/s (SCCM)	1.5 (900): Water cooling 1.0 (600): TMS unit is used (60 °C)	
Allowable backing pressure[*1]		Pa (Torr)	333 (2.5) : Water cooling/TMS unit used	
Flow rate of purge gas <N_2>		Pa·m^3/s (SCCM)	3.4×10^{-2} (20)	
Rated speed		rpm	27,000	
Backup rotational speed[*2]		rpm	Approximately 6,000	
Starting time[*3]		min	9: with SCU-1500/SCU-1600 10: with SCU-1400	
Stopping time[*3]		min	9: with SCU-1500/SCU-1600 11: with SCU-1400	
Noise		dB	<50 (at 27,000 rpm)	
Temperature Management System (TMS)			Available	
Baking temperature		°C	<120	
Lubricating oil			Not necessary	
Installation position			Free	
Cooling method			Water cooling	
Recommended backing-pump		L/min	>1,300	
Mass[*4]		kg	72	
Ambient temperature range		°C	0 to 40	
Storage temperature range		°C	-25 to 55	
Applicable Control unit			SCU-1400/SCU-1500/SCU-1600	

*1 The pressure is applicable under conditions that N_2 or other similar gas is vacuumed and the backing-pump (pumping speed: 1,300 L/min) is used. When the gas is exhausted intermittently, the gas more than the maximum gas flow-rate can be exhausted. Consult Edwards about conditions.

*2 A backup rotational speed is the lowest rotational speed to which the magnetic bearing can be backed up at a power failure.

*3 Time varies depending on the control unit used.

*4 Mass is a value of state that the only standard accessory was installed (except the optional accessory).

1.1.2 Condition for the water-cooling unit

Item	Specification
Port type	Rc 1/4 (Female) *1
Flow rate L/min	2
Water temperature °C	5 to 25
Water pressure MPa (kgf/cm^2)	0.3 (3)

*1 Standard type

1.2 External appearance of the STP pump

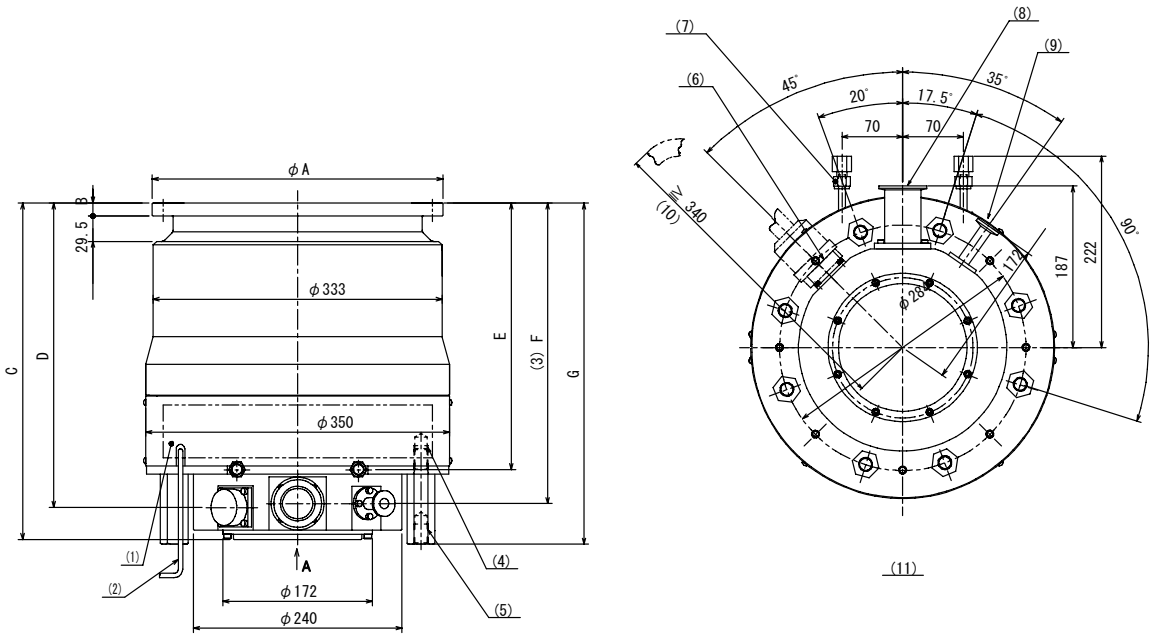


Figure 1 - STP-A2503 series: VG250/ISO250F

No.	Item	Description
1	TMS heater	Built-in
2	TMS heater cable	
3	Height of the purge port	
4	Screw hole for legs	8-M16 depth 24
5	Screw hole of legs	8-M16 depth 24
6	STP cable connector	
7	Cooling water port	Rc[*1]1/4
8	Outlet port flange	KF40
9	Purge port	KF10
10	Bending dimension of the STP connection cable	
11	Viewed from arrow A	

Inlet port flange	VG250	ISO250F
ϕA	350	335
B	15	15
C	389.5	389.5
D	352.5	352.5
E	308	308
F	348	348
G	395	395

[*1] ISO

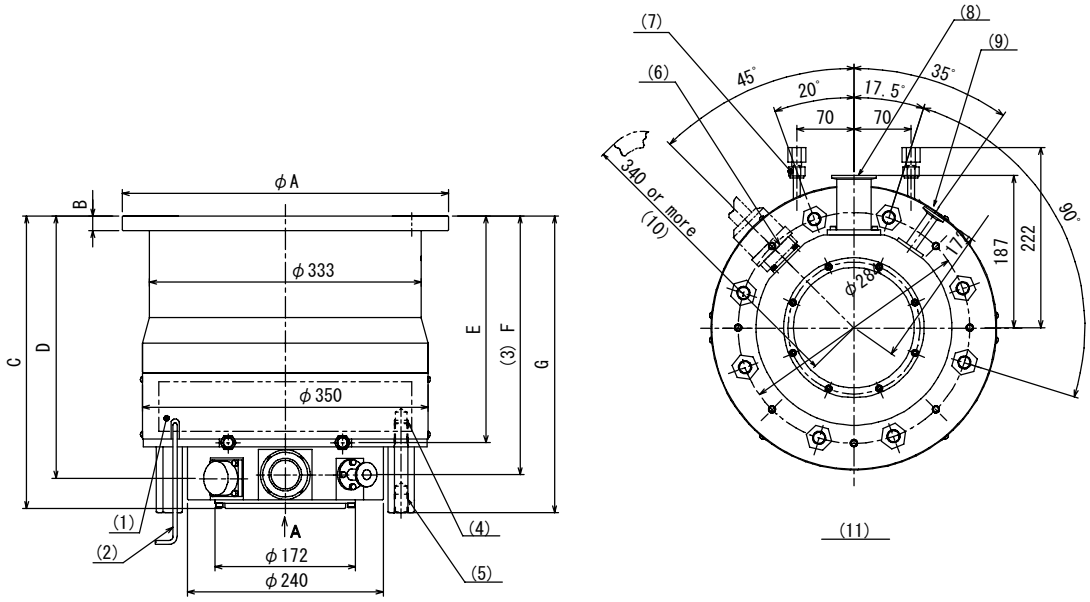


Figure 2 - STP-A3003 series: VG350/VG300/ISO320F

No.	Item	Description
1	TMS heater	Built-in
2	TMS heater cable	
3	Height of the purge port	
4	Screw hole for legs	8-M16 depth 24
5	Screw hole of legs	8-M16 depth 24
6	STP cable connector	
7	Cooling water port	Rc[*1]1/4
8	Outlet port flange	KF40
9	Purge port	KF10
10	Bending dimension of the STP connection cable	
11	Viewed from arrow A	

Inlet port flange	VG350	VG300	ICF320F
φA	450	400	425
B	20	18	20
C	359.5	359.5	364.5
D	322.5	322.5	327.5
E	278	278	283
F	318	318	323
G	365	365	370

[*1] ISO

1.3 Label affixing positions

Refer to the Instruction Manual (A) for the details of the labels 1 to 7.

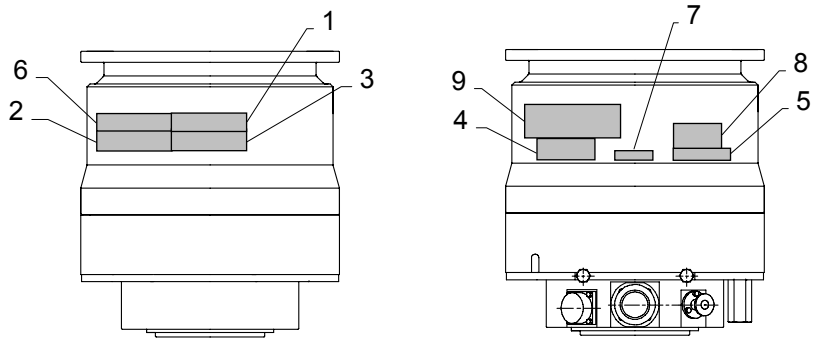


Figure 3 - Label affixing positions for the STP pump

1	STP pump installation warning label
2	Hot surface warning label
3	Heavy product caution label
4	Connector caution label
5	STP pump/control unit caution label
6	TMS heater caution label
7	Rotational direction instruction label
8	Name plate
9	Company logo

1.4 Accessories

Item	Q'ty	Remarks
Inlet port cover	1	
Outlet port cover	1	
STP connector cover	1	
Blank flange for purge port	1	KF10
Clamping ring for purge port	1	KF10
O-ring washer for purge port	1	KF10
Leg	8	
Instruction Manual (B)	1	This manual

This page intentionally blank.

2 HOW TO SECURE THE STP PUMP

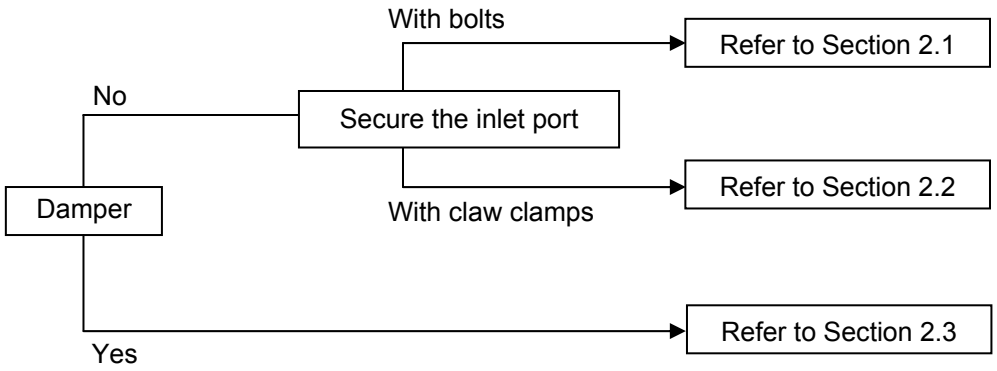
WARNING

The STP pump is provided with a high-speed rotor. Any internal abnormality/error may result in a jump in rotational torque leading to personal injury or peripheral equipment damage.

The STP pump is provided with a high-speed rotor. The worst-case failure may result in a jump in rotational torque leading to personal injury or peripheral equipment damage.

The method of securing the STP pump will depend on the installation requirements. Secure the STP pump to the vacuum equipment as follows:

Design and secure the mounting for the STP pump so that it can withstand the maximum rotational torque. Refer to Table 2 for torque in pump abnormality.



In some cases, the damper and the claw clamper securing cannot be used.

This will depend on the type of STP pump. Refer to Table 1 for torque tightening the bolts used.

Bolt size	Tightening torque (Nm)
M8	12
M10	24
M12	42

Table 1 - Tightening torque of bolt

When making the legs to secure the base, make them shorter than the ones attached to the STP pump. Use a material that has a tensile strength of 600N/mm^2 or more.

When securing the base, use stainless steel securing bolts with a tensile strength class of 70 or more.

Note: When using any securing method other than that specified in this manual, contact Edwards.

2.1 When securing the inlet port with bolts

Refer to Table 2 for maximum predicted torque in any pump abnormality and for the recommended type of securing bolt for inlet port flange.

Secure the inlet port flange with the correct size bolts as specified in the Inlet Port Flange Standard.

Reduced diameter shank bolts (R.D.S.B.) listed on Table 2 are more reinforced bolts over standard bolts by smoothing the portion to attach flange securing bolts to the respective face at the equipment side. Refer to Figure 5 for Shape of R.D.S.B.

Secure the base with either the 8 screws for legs or the 8 attached legs. Ensure instructions with regard to legs and bolts for securing the base are adhered to page 9. Make sure that the recommended securing bolt is the correct one depending on the method of securing the base.

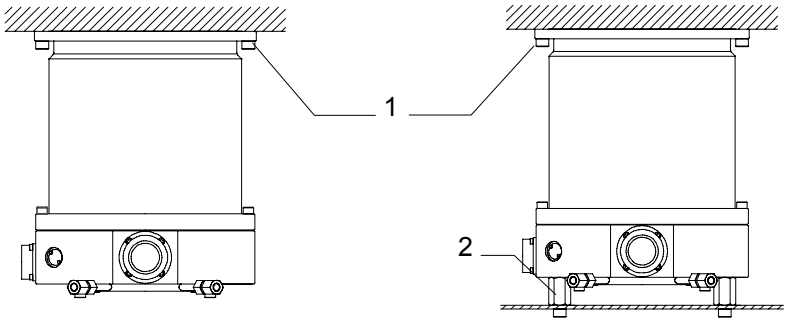
Pump model		**STP-A2503 series**					
Flange type		VG250		ISO250F		ICF305	
Torque in pump abnormality [Nm]		7.4×10^4		5.9×10^4		7.4×10^4	
Base (8 positions) securing		No	Yes	No	Yes	No	Yes
Recommended securing bolt for flange	Shape	Standard	Standard	R.D.S.B.*2	Standard	Standard	Standard
	Size	M12	M12	M10	M10	M8	M8
	Q'ty	12	12	12	12	32	32
	Material*1	Carbon steel Alloyed steel	Stainless steel	Carbon steel Alloyed steel	Stainless steel	Carbon steel Alloyed steel	Stainless steel
	Strength*1	12.9 or more	70 or more	12.9 or more	70 or more	12.9 or more	70 or more

Pump model		**STP-A3003 series**					
Flange type		VG300		ISO320F		VG350	
Torque in pump abnormality [Nm]		7.4×10^4		7.4×10^4		7.4×10^4	
Base (8 positions) securing		No	Yes	No	Yes	No	Yes
Recommended securing bolt for flange	Shape	Standard	Standard	Standard	Standard	Standard	Standard
	Size	M12	M12	M12	M12	M12	M12
	Q'ty	12	12	12	12	12	12
	Material*1	Carbon steel Alloyed steel	Stainless steel	Carbon steel Alloyed steel	Stainless steel	Carbon steel Alloyed steel	Stainless steel
	Strength*1	12.9 or more	70 or more	12.9 or more	70 or more	12.9 or more	70 or more

*1 Refer to ISO898-1 (JISB 1051), ISO3506 (JISB 1054) and AMS6419 (Aerospace Material Specification).

*2 Refer to Figure 5 Shape of Reduced Diameter Shank Bolts (R.D.S.B.)

Table 2 - Maximum torque predicted and recommended securing bolt for inlet port flange

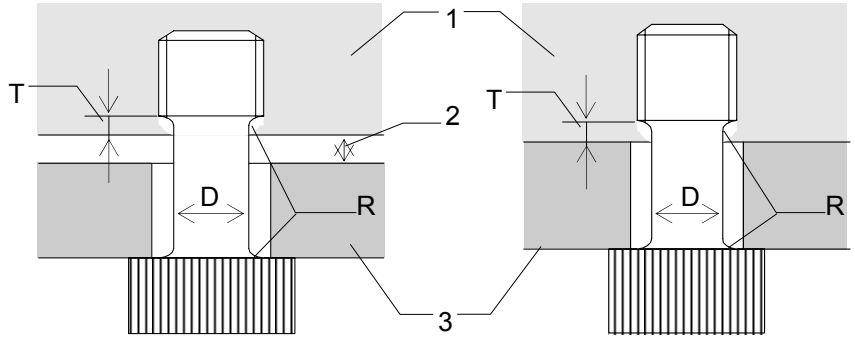


(A) When the base is not secured (B) When the base is secured

1. Recommended fitting bolt for flange
2. Secure the base

Figure 4 - Example of securing the STP pump (when securing the inlet port with bolts)

Refer to Figure 5 for the shape of Reduced Diameter Shank Bolts (R.D.S.B.)



1. Vacuum equipment
2. Clearance made by cantering
3. Pump flange

Figure 5 - Shape of reduced diameter shank bolts

Use Table 3 in conjunction with Figure 5. Ensure that the surface of the levelled and smoothed area (expressed by "D" in Figure 5) is free of crack, depression, and other damages. Also, when you want to use commercially-available screws, be sure to thoroughly grind them so as not to leave spiral seams on their bottom.

Bolt size	Type of flange	T	D	R
M8	ISO_F flange	2.5 mm or more	5.9 mm or more	0.8 mm or more
	ICF flange	1 mm or more		
M10	ISO_F flange	3 mm or more	7.5 mm or more	
	VG flange	1.5 mm or more		
M12	ISO_F flange	3.5 mm or more	9.1 mm or more	
	VG flange	2 mm or more		

Table 3 - Shape of reduced diameter shank bolts

2.2 When securing the inlet port flange with claw clamps

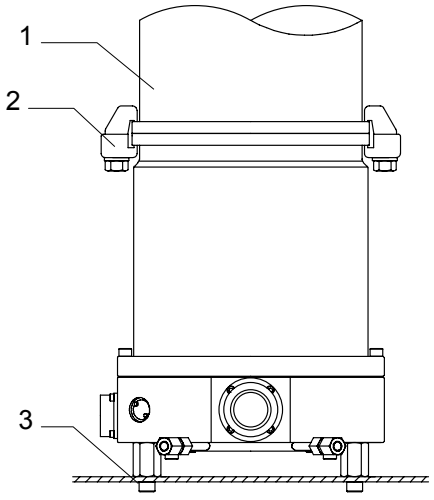
Refer to Table 2 for rotational torque.

When securing the inlet port flange with only the claw clamp, the vacuum equipment cannot withstand the maximum rotational torque generated by the worst-case failure. To make the vacuum equipment withstand abnormal torque, secure the base with either the 8 screws for legs or the 8 attached legs. Ensure instructions with regard to legs and bolts for securing the base are adhered to page 9.

For the claw clamp-type, use the required number of claw clamps as specified in Table 4. Position the claw clamps evenly on the circumference.

Flange size	Number of claw clamps
ISO 160 or less	4 or more
ISO 200 to 250	6 or more
ISO 320 or more	8 or more

Table 4 - Number of claw clamps for flange size



1. Vacuum equipment
2. Claw clamps
3. Secure the base

Figure 6 - Example of securing the STP pump
(when securing the inlet port flange with claw clamps)

2.3 When installing the damper in the inlet port flange

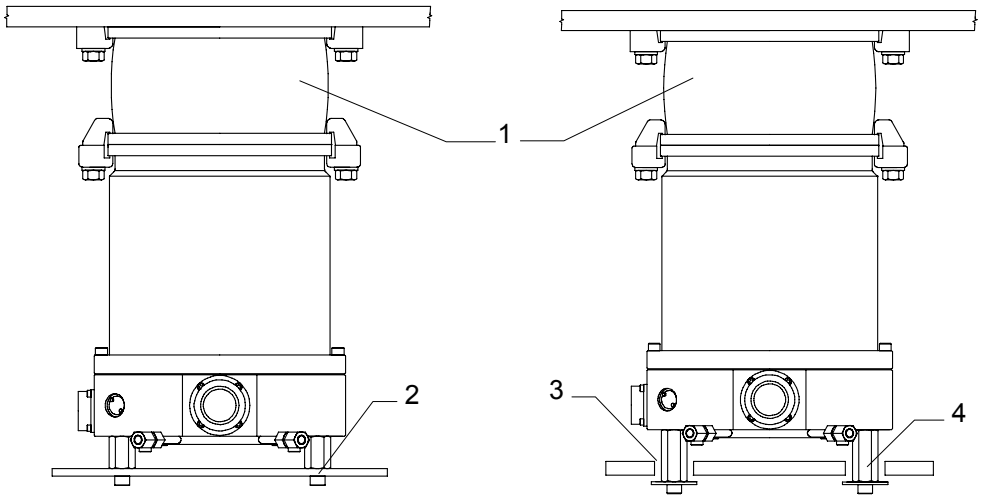
CAUTION
Use a damper only at the vertically upright position.

CAUTION
DO NOT remove the bolts and nuts attached to reinforce the damper.

Refer to Table 2 for rotational torque.

When using a damper, secure the base with either the 8 screw-holes for legs or the 8 attached legs. Ensure instructions with regard to legs and bolts for securing the base are adhered to page 9.

When the base cannot be secured because of the equipment design, install the pump with a torque restraint like the one shown in Figure 7 (B).



(A) When securing the base (B) When installing not to rotate

1. Damper
2. Secure the base
3. Hole to prevent from rotating
4. Leg

Figure 7 - Example of securing the STP pump (when installing the damper in the inlet port flange)

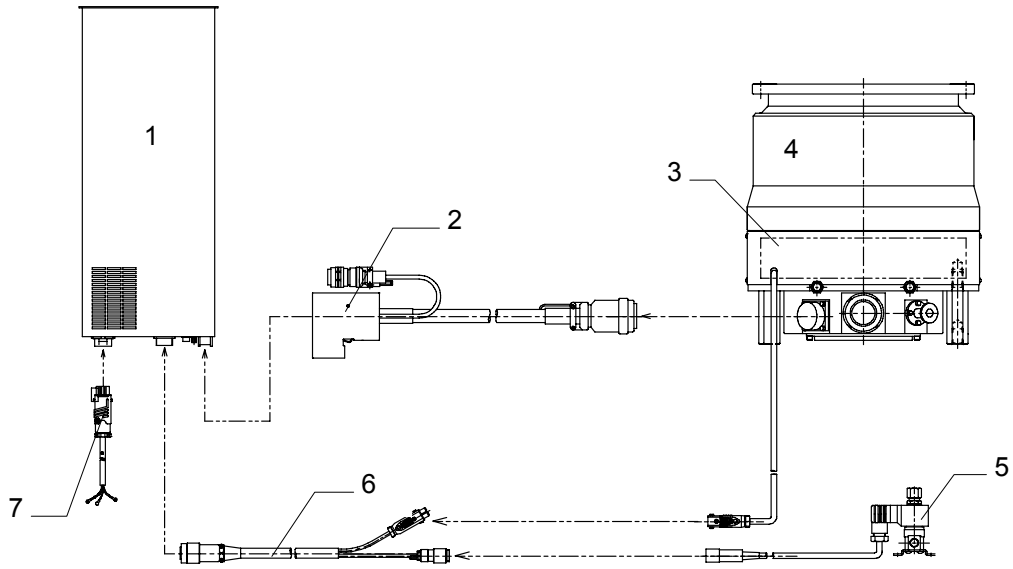
3 TEMPERATURE MANAGEMENT SYSTEM (TMS)

WARNING

The STP pump operates at high temperatures while the Temperature Management System (TMS) unit is in operation. NEVER touch the STP pump and its peripheral equipment while TMS unit are in operation. Operators can burn hands.

The Temperature Management System (TMS) maintains the temperature of the turbomolecular pump by monitoring the temperature with temperature sensor in the base of the turbomolecular pump, and performing the TMS valve and TMS heater ON/OFF control.

3.1 Configuration of the STP pump with the TMS



1. STP control unit
2. STP connection cable
3. TMS heater
4. STP pump
5. TMS valve
6. TMS connection cable
7. Power cable

Figure 8 - Configuration of the STP pump with the TMS

Note: The shape of each part is an example. It varies according to specifications.

3.2 TMS connection cable

The components of the TMS connection cables are as follows: (see Figure 9)

Item	Description	Function
1	Connector X5A	For the STP control unit
2	CON1 HEATER OUT connector	For the TMS heater
3	CON2 COOLING VALVE OUT connector	For the TMS valve

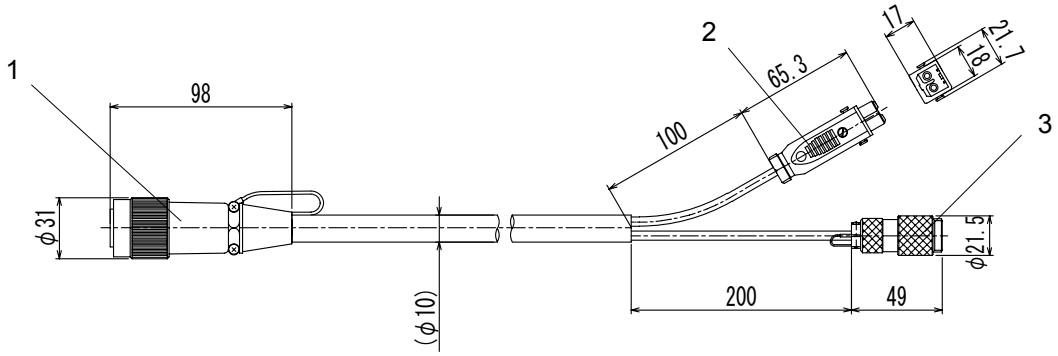


Figure 9 - External view of TMS connection cable

Note: The shape of the TMS connection cable is an example. It varies according to specifications.

3.3 TMS heater

The TMS heater heats the base of the STP pump. It's fitted with the STP-A2503CV/A3003CV series at the factory.

3.4 TMS valve

The TMS valve controls the cooling water in order to maintain a constant temperature inside the STP pump. The shape of the TMS valve varies according to specifications.

3.5 TMS sensor cable

The TMS sensor cable is not required for STP-A2503CV/A3003CV series.

3.6 Installation of the TMS unit

CAUTION
DO NOT install the TMS unit in places with high temperature, humidity, noise, vibration, or other unstable environment.

CAUTION
DO NOT apply force to the TMS unit and cables during installation and DO NOT bend the cables excessively.

3.6.1 Connecting the TMS connection cable to the STP control unit

Insert the connector X5A of the TMS connection cable into the connector X5 of the STP control unit. (see the "STP Control Unit Instruction Manual (C)" for the position of the connector X5.)

3.6.2 Connecting the pump and TMS valve

Refer to Figure 8, "Configuration of the STP pump with the TMS".

Connect the cooling water pipe to the TMS valve. Pay special attention to the port label on the cooling water valve to connect proper port. Connect the NC side (or OUT side) of the TMS valve to the STP pump, and COM side (or IN side) of the TMS valve to the equipment.

The TMS heater is fitted with the STP-A2503CV/A3003CV at the factory.

Use cooling water under the conditions in Section 3.7, “Condition for the TMS unit”.

Note: Procure and connect the cooling water pipe and affix the electromagnetic cooling water valve at your site. The diameter of the valve is Rc1/4 (ISO standard).

3.6.3 Connecting TMS connection cable to STP pump

Refer to Figure 8, "Configuration of the STP pump with the TMS".
Connect the TMS connection cable to the STP pump as follows:

1. Connect the cable for the TMS heater to the "CON1 HEATER OUT" connector of the TMS connection cable.
2. Connect the cable for the TMS valve to the "CON2 COOLING VALVE OUT" connector of the TMS connection cable.

3.7 Condition for the TMS unit

Item		Condition
Ambient temperature range	°C	0 to 40
Storage temperature range	°C	-20 to 55
Input voltage		Same voltage as the STP control unit 200 to 240 Vac
Temperature control method		Control ON/OFF of the TMS heater and cooling water
Setting temperature	°C	Standard type: 60
Cooling water temperature	°C	5 to 25
Quantity of cooling water flow	L/min	2
Alarm output		Alarm outputs from the STP control unit

3.8 Accessories

Item	Q'ty	Condition
TMS heater	1	Built-in
TMS connection cable	1	With connector on one side
TMS valve	1	Coupling for water cooling port, cable with connector on one side

For more information, contact the nearest Service Office.

Manufacturer:

Edwards Japan Limited

1078-1, Yoshihashi, Yachiyo-shi, Chiba 276-8523 JAPAN

Telephone:	Domestic	047-458-8822
	International	+81-47-458-8822
Facsimile:	Domestic	047-458-8833
	International	+81-47-458-8833

Copyright 2010 Edwards Japan Limited. All rights reserved.

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP