NOP® COOLANT UNIT

Products Guide

NOP®

Nippon Oil Pump Co., Ltd.

E SERIES

EP

Pump: **Plunger**
Motor: **2200~3700 W/AC**
Flow rate: **12~28.8 ℓ/min**
Maximum Pressure: **7.0 MPa**

ET·ES

Pump: **Trochoid™**
Motor: **750~1500 W/AC**
Flow rate: **12~28.8 ℓ/min**
Maximum Pressure: **2.0 MPa**

C SERIES

CT

Pump: **Trochoid™**
Motor: **750~1500 W/AC**
Flow rate: **12~28.8 ℓ/min**
Maximum Pressure: **2.0 MPa**

CI

Pump: **Impeller**
Motor: **1500~3700 W/AC**
Flow rate: **150~300 ℓ/min**
Total pump head: **40~65 m**

NOP® COOLANT UNIT

What is NOP Coolant Unit?

E Series: for High-to-medium Pressure

EP: Plunger-type High-pressure Coolant Unit

ET・ES: Trochoid™-type Medium-pressure Coolant Unit

Line-type

C Series: for Medium-to-low Pressure

CT: Trochoid-type Medium-pressure Coolant Unit

CI : Large flow Low-pressure Coolant Unit

TAZUNA™

Specification Tables for All Series

NOP Coolant Unit User's Instruction Manual (Abstract)

Be sure to read instruction manual provided with the product before use.

NOP coolant unit is compliant with the RoHS Directive and Reach Regulation.

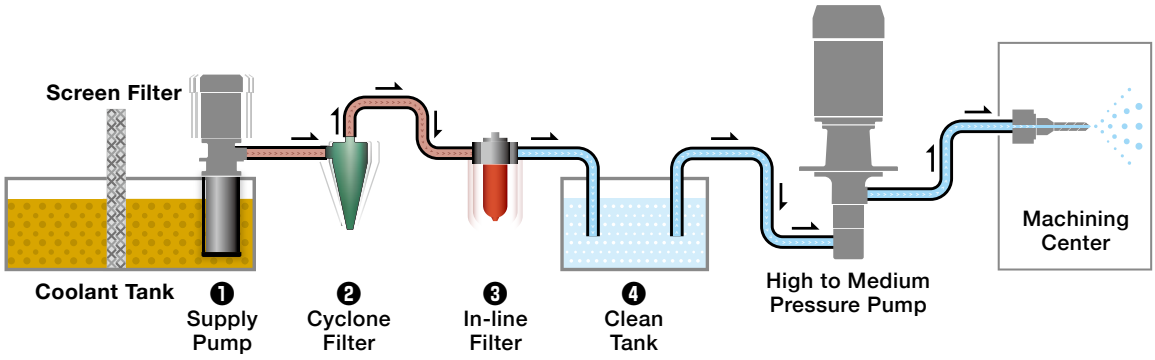
NOP® COOLANT UNIT

Less space required, less maintenance work, and less hassle in swarf recovery.

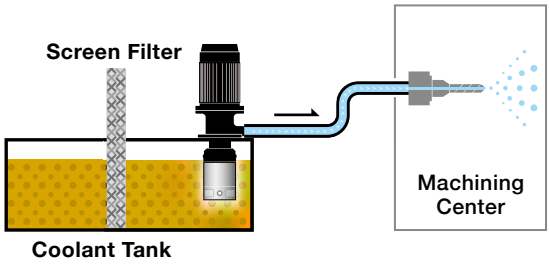
Feature 1　Less space required

Various components of the coolant unit are all combined in one. NOP coolant unit greatly expands the working space and offers an easy-to-work and efficient environment

■ Conventional high/medium pressure coolant unit

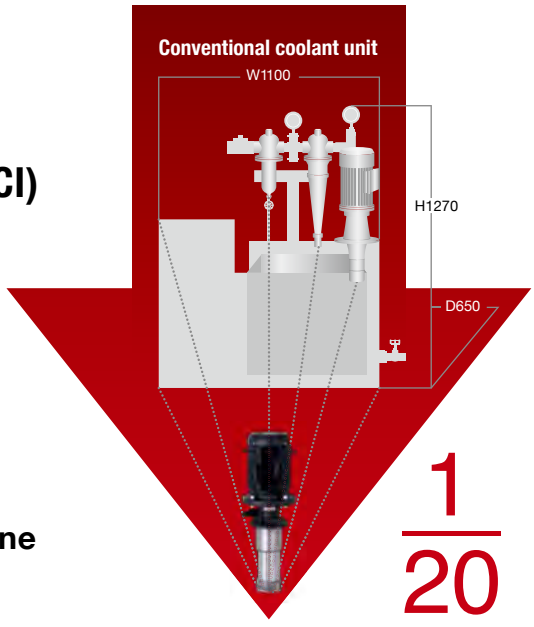


■ Proposal by NOP Coolant Unit (except CI)



Various components are all combined in one

❶ NO Supply Pump
❷ NO Cyclone Filter
❸ NO In-line Filter
❹ NO Clean Tank



NOP COOLANT UNIT
NOP COOLANT UNIT EP
W269 x H753 x D269

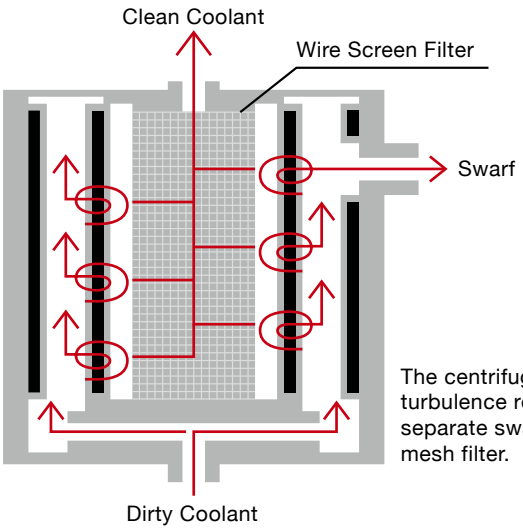
Feature 2　Turbulence™ filter

※ CT and CI models employ cyclone system for filtration so the structures are different from the one shown below.

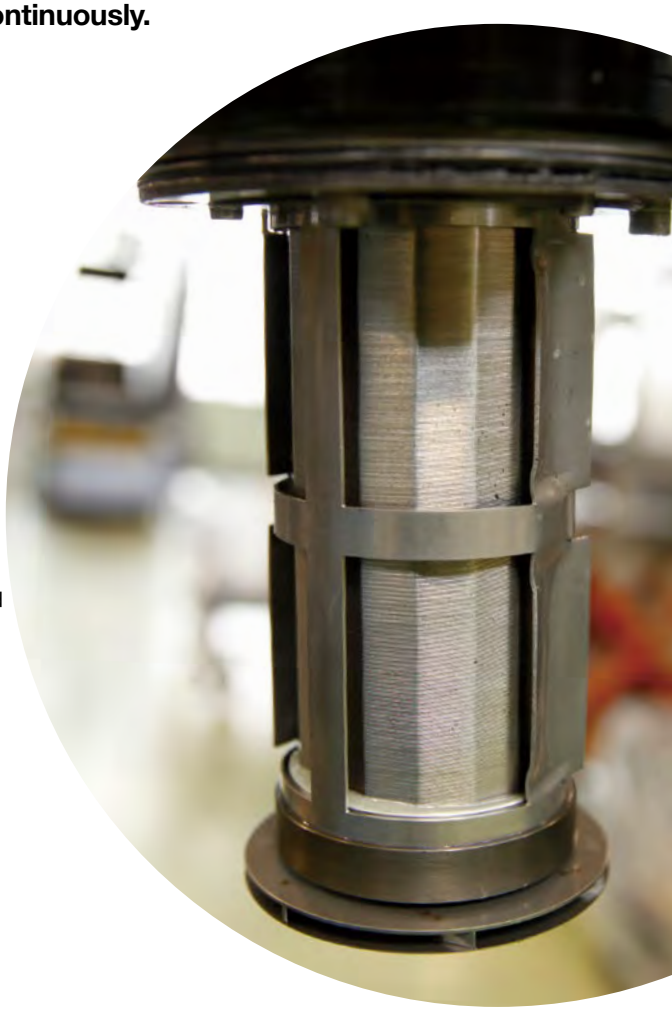
NOP coolant unit can achieve substantial reduction in filter maintenance with compact design which ensures clog-free filtration system, by automatically washing away swarf sticking to the filter.

Our special Turbulence™ design generates turbulence around the surface of filter with 2 wing-shaped vanes rotating around filter and can wash away swarf from filter surface continuously.

[Turbulence™ filter]



The centrifugal force and turbulence release and separate swarf from the mesh filter.



Feature 3　Less hassle in swarf recovery

Swarf recovery is simple! NOP coolant unit separates and ejects swarf in lumps.

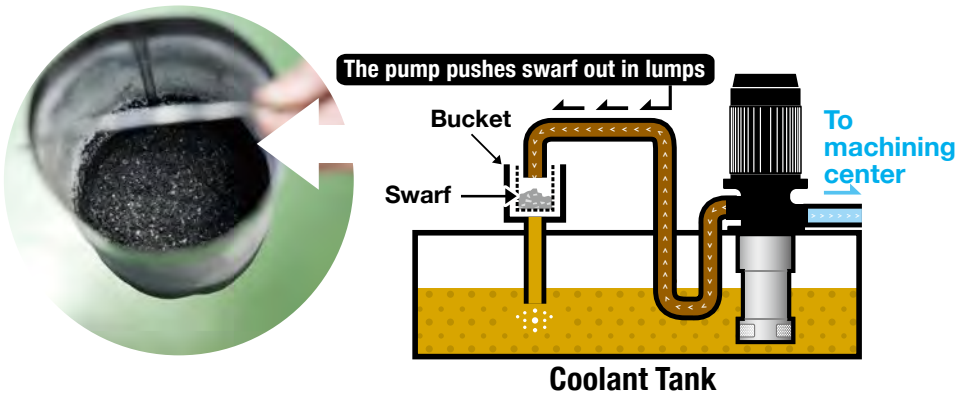
NOP coolant unit cleans the coolant, but that is not all. It also collects cumbersome swarf. It ejects separated swarf from the contaminant drain port to the bucket.

Swarf recovery is incomparably simpler than the conventional system.

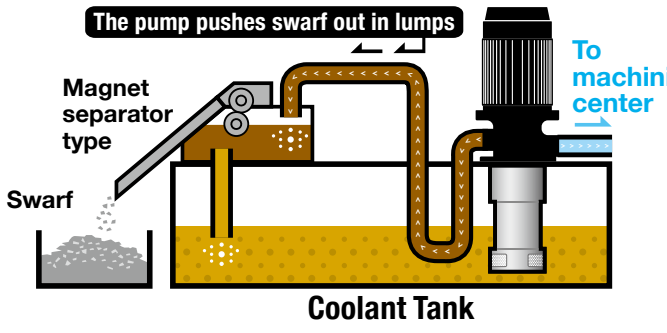
※ The Contaminant drain port discharges coolant thickened with swarf.

■ Samples of swarf collection

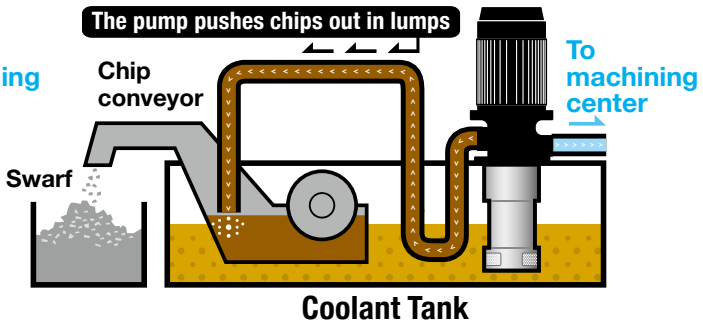
❶ Bucket type



❷ Magnet separator type



❸ Drum filter type



E SE

Element Model

NOP® COOLANT UNIT

with Built-in Turbulence™ Filter

EP

Received the"2015 JSME Excellent Product Award"

Plunger-type, All-in-one High-pressure Coolant unit

Turbulence™ filter

Special turbulence cleans the filter automatically, rendering the filter clog free.

Plunger pump/ 7.0 MPa - 3.0 MPa

Piston action pushes fluid at high to medium pressure.

Compatible with the TAZUNA™ fluid control system (software)

TAZUNA reduces the electric power cost further by approximately 20%.
The pressure and flow rate are automatically adjusted.

■ Model Numbering System

TOP–YTH ① ② - ③ E VD ④ ⑤

① Motor capacity	2200: 2.2 kW	
	3700: 3.7 kW	
② Motor type*1	Standard motor	A3: AC 200/200/220/230 V 50/60/60/60 Hz 3 phase electric induction motor(IE3) with CE marking
	Local motor	AE: supplied by NOP Deutschland (Germany) AF: supplied by NOP Taiwan AJ: supplied by NOP Asia (China) AK: supplied by NOP India
③ Flow rate	P008: Plunger pump, 8 cc/rev	
	P010: Plunger pump, 10 cc/rev	
	P014: Plunger pump, 14 cc/rev	
	P016: Plunger pump, 16 cc/rev	

Filtering method	E: Turbulence™ filter type
Relief valve	VD: External return type
④ Relief pressure setting*2	70 : 7.0 MPa
	60 : 6.0 MPa
	35 : 3.5 MPa
	30 : 3.0 MPa
⑤ Filtering performance	B : 50 μm*3
	C : 20 μm*4

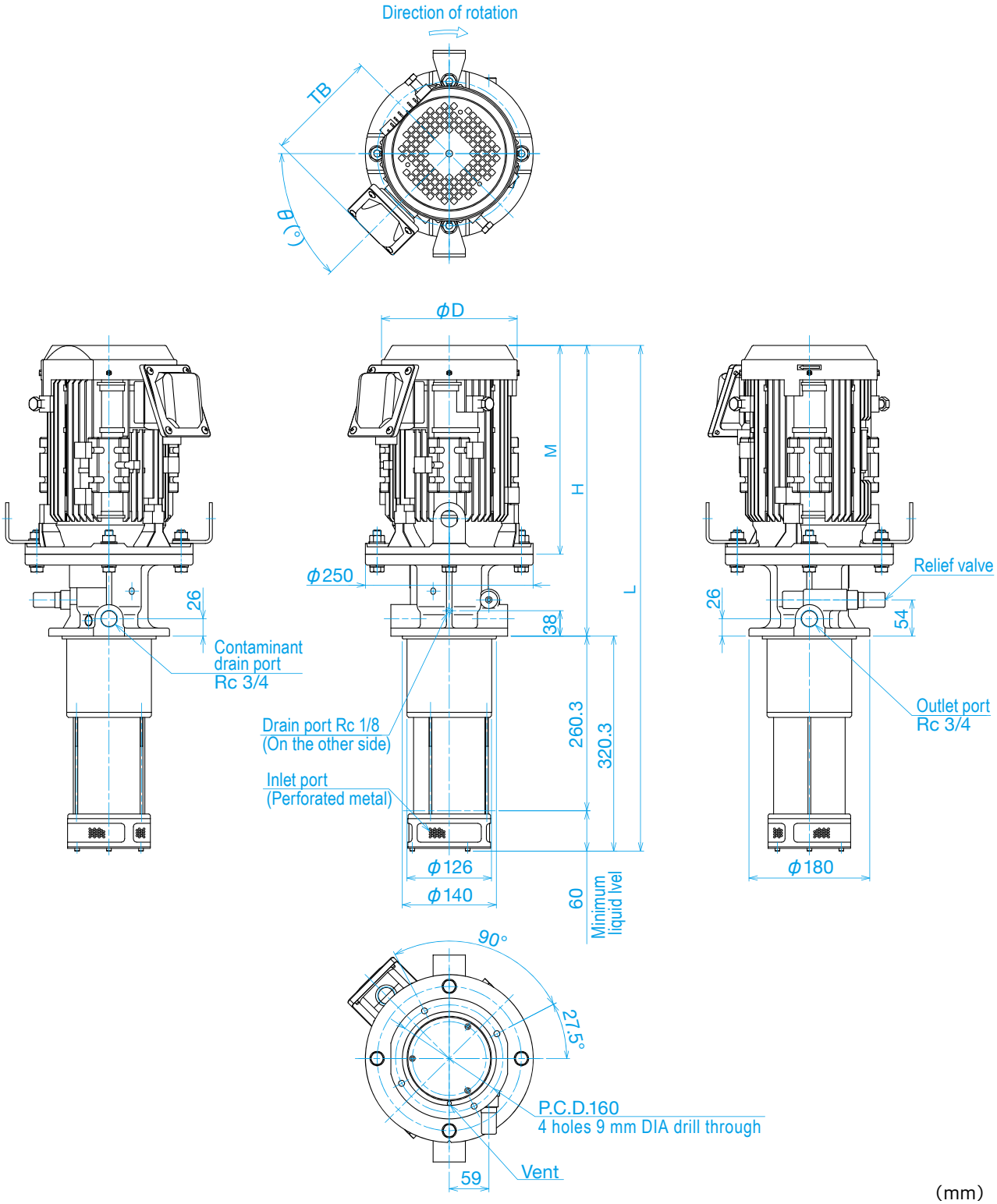
***1** For further details about the local motor, please contact our overseas branch or subsidiaries.
***2** Refer to page 39 for the compatible model for each relief pressure setting.
***3** Please consult us if you use straight oils as they can only be used in limited conditions.
***4** 20 μm filter is not applicable to straight oils.

■ Specifications

Item / Model	Motor capacity (kW)	Flow rate (ℓ/min) 50 Hz / 60 Hz	Maximum pressure (MPa) 50 Hz / 60 Hz	Approximate weight (kg)
YTH2200A3-P008EVD**	2.2	12.0 / 14.4	7.0 / 7.0	53
YTH2200A3-P010EVD**		15.0 / 18.0	7.0 / 6.0	
YTH2200A3-P016EVD**		24.0 / 28.8	3.5 / 3.0	
YTH3700A3-P014EVD**	3.7	21.0 / 25.2	7.0 / 7.0	62
YTH3700A3-P016EVD**		24.0 / 28.8	7.0 / 6.0	

★ ④ Relief pressure setting

■ Dimensional Drawing (Typical / Motor type : A3)



(mm)

Model	L	H	M	ϕD	θ(°)	TB
YTH2200A3-P008EVD★★	753.3	433	311	202	45	168
YTH2200A3-P010EVD★★	753.3	433	311	202	45	168
YTH2200A3-P016EVD★★	753.3	433	311	202	45	168
YTH3700A3-P014EVD★★	768.3	448	326	243	45	187
YTH3700A3-P016EVD★★	768.3	448	326	243	45	187

※ **Drawings in PDF** Drawings can be downloaded from NOP coolant unit website **http://coolant-unit.nopgroup.com/en/**

NOP® COOLANT UNIT Features of EP

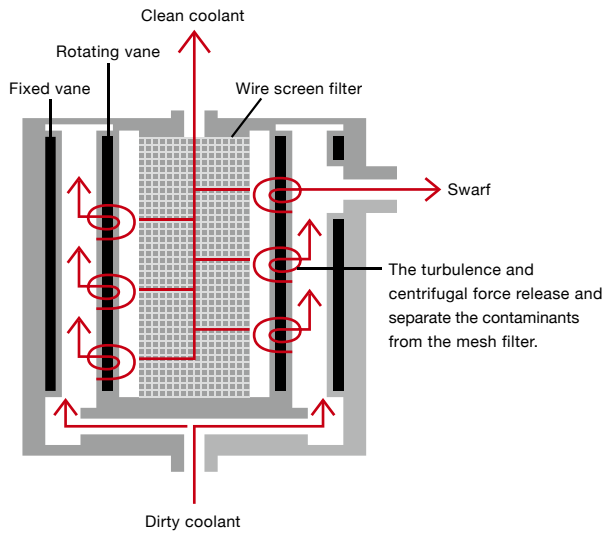
An All-in-one, High-to-medium Pressure Coolant Unit

All components of a coolant system are consolidated into a single unit. No in-line and suction filters are required. The use of NOP coolant unit reduces the required space to about 1/20th by volume of that occupied by a conventional coolant system. The saved space expands the available plant space, resulting in a higher production efficiency.

- Maximum operating pressure: 7.0 MPa
- Maximum flow rate: 28.8 liters/min
- No suction filter is required
- No in-line filter is required
- No clean tank is required
- No transfer pump is required on the coolant tank end
- No plumbing is required to interconnect various components

Turbulence™ Filter

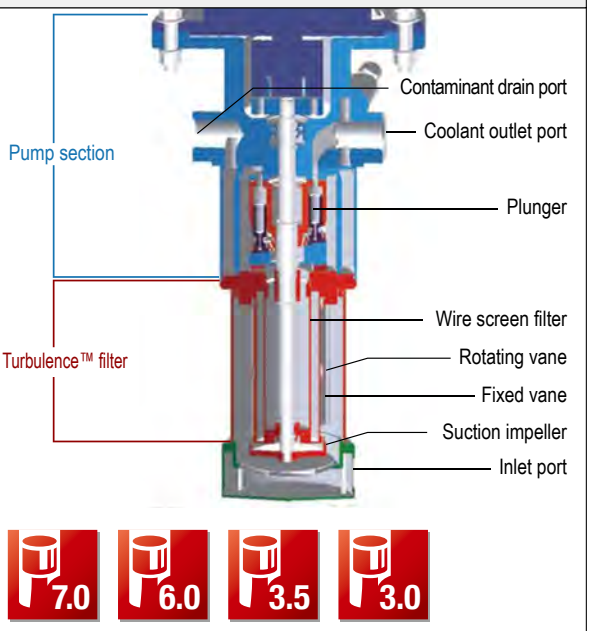
Our special Turbulence™ design generates turbulence around the surface of filter with 2 wing-shaped vanes rotating around filter and can wash away swarf from filter surface continuously.



High efficiency plunger pump

- Compatible fluid type
  - Water-soluble cutting fluids (Please consult us if you use straight oils)
  - Not for lubricant oils or fuel oils (Flamable)
  - Not for clear water, demineralized water, aqueous solutions and viscous fluids without rust-preventive property, corrosive fluids, solvents, and any cutting fluids that contain active sulfur
- Relief valve is built into the unit

Plunger Pump

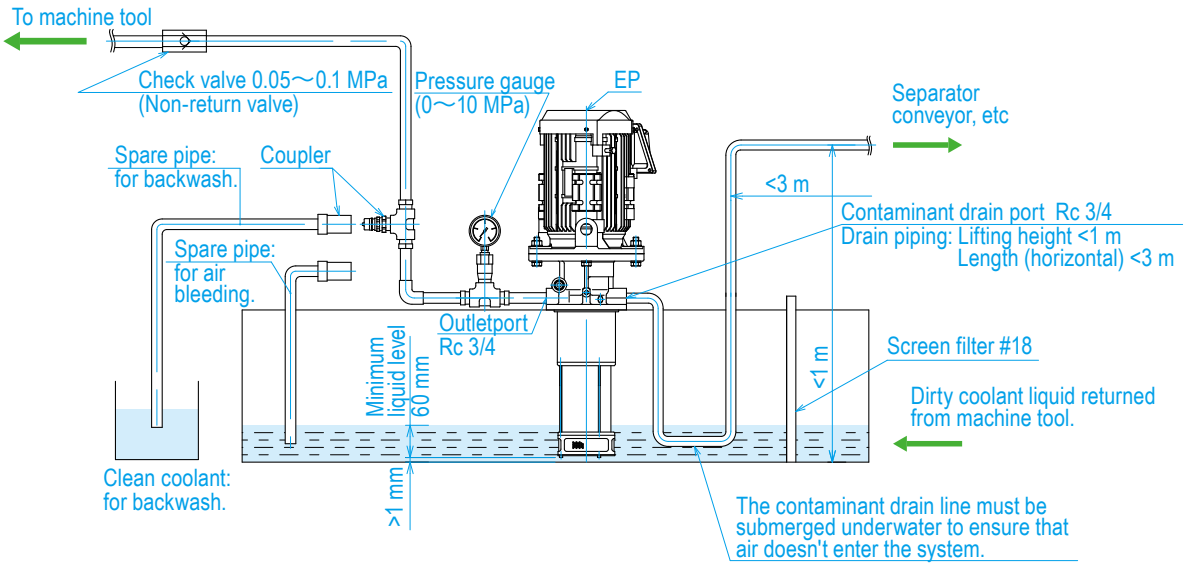


Filtration performance (Nominal value)

Suction strainer	3 mm (Solids larger than this must be removed from the tank)
Filter	20 μm, 50 μm

※Please consult us if you use straight oils.

A Sample System Layout



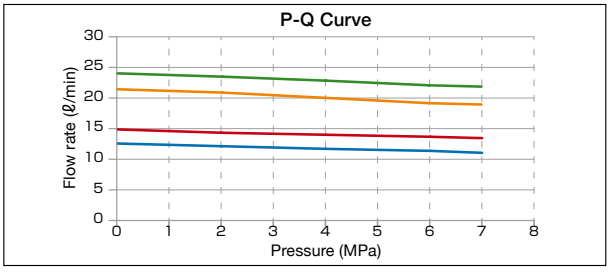
■ Performance Curves

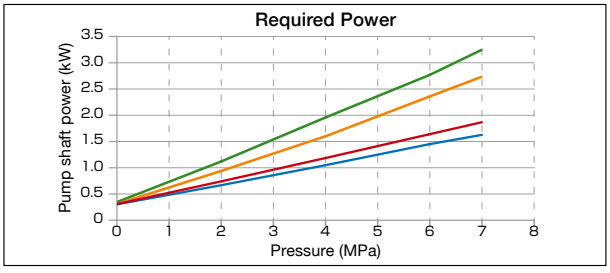
Water-soluble coolant (general performance)

Oil used: JIS K2241, Type A3 solution containing 2% water-soluble cutting fluid

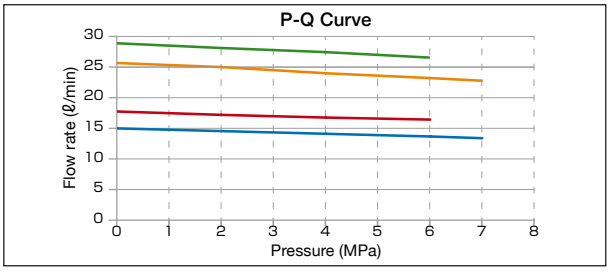
EP008 EP014
EP010 EP016

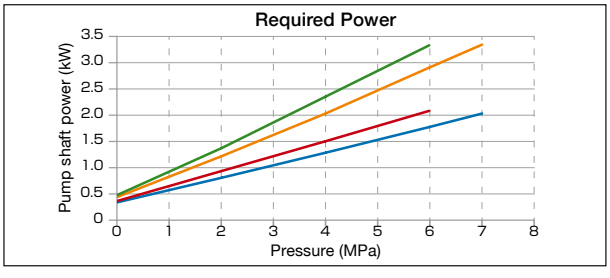
50 Hz





60 Hz





ET·ES

Received
the"2015 JSME Excellent Product Award"

Trochoid™-type, All-in-one Medium-pressure Coolant unit

Turbulence™ filter

Special turbulence cleans the filter automatically, rendering the filter clog free.

Trochoid™ pump/ 2.0 MPa, 1.5 MPa

A rotor turning in a trochoidal curve generates pressure to suck and discharge fluid. This is an extremely efficient self-priming pump.

Compatible with the TAZUNA™ fluid control system (software)

TAZUNA reduces the electric power cost further by approximately 20%.
The pressure and flow rate are automatically adjusted.

■ Model Numbering System

TOP–YTH ① ② - ③ E VD ④ ⑤

① Motor capacity	750: 0.75 kW	
	1500: 1.5 kW	
② Motor type*1	Standard motor	A3: AC 200/200/220/230 V 50/60/60/60 Hz 3 phase electric induction motor (IE3) with CE marking
	Local motor	AE: supplied by NOP Deutschland (Germany) AF: supplied by NOP Taiwan AJ: supplied by NOP Asia (China) AK: supplied by NOP India
③ Rotor capacity	T208: Trochoid™ pump, 8 cc/rev	
	T216: Trochoid™ pump, 16 cc/rev	
	S208: Trochoid™ pump, 8 cc/rev*2	
	S216: Trochoid™ pump, 16 cc/rev*2	

Filtering method	E: Turbulence™ filter type
Relief valve	VD: External return type
④ Relief pressure setting*3	20 : 2.0 MPa
	15 : 1.5 MPa
⑤ Filtering performance	B : 50 μm
	C : 20 μm*4

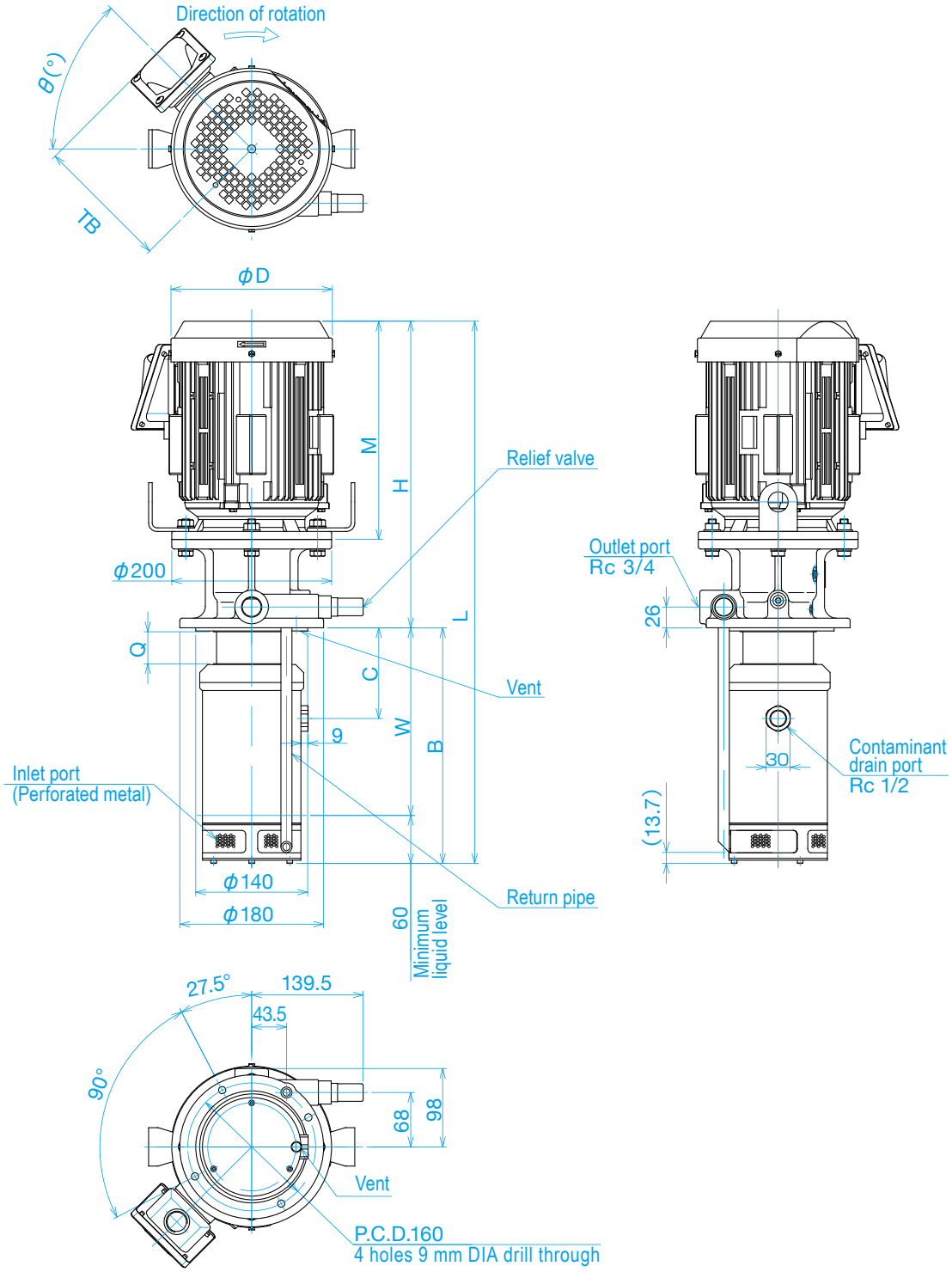
*1 For further details about the local motor, please contact our overseas branch or subsidiaries.
*2 ES is wear resistant type for hard and abrasive materials.
*3 See page 39 for compatible model for each relief pressure setting.
*4 20 μm filter is not applicable to straight oils.

■ Specifications

Model \ Item	Motor capacity (kW)	Flow rate (ℓ/min) 50 Hz / 60 Hz	Maximum pressure (MPa)	Approximate weight (kg)
YTH750A3-T208EVD**	0.75	12.0 / 14.4	1.5 / 1.5	34
YTH1500A3-T216EVD**	1.5	24.0 / 28.2	2.0 / 2.0	39
YTH750A3-S208EVD**	0.75	12.0 / 14.4	1.5 / 1.5	34
YTH1500A3-S216EVD**	1.5	24.0 / 28.2	2.0 / 2.0	39

★ ④ Relief pressure setting, ⑤ Filtering performance

■ Dimensional Drawing (Typical / Motor type : A3)



(mm)

Model	L	B	C	W	Q	H	M	φD	θ(°)	TB
YTH750A3-T208EVD**	638.8	274.8	93.5	214.8	20	364	253.5	170	30	151
YTH1500A3-T216EVD**	678.3	294.8	113.5	234.8	40	383.5	273	202	45	168
YTH750A3-S208EVD**	638.8	274.8	93.5	214.8	20	364	253.5	170	30	151
YTH1500A3-S216EVD**	678.3	294.8	113.5	234.8	40	383.5	273	202	45	168

※ **Drawings in PDF** Drawings can be downloaded from NOP coolant unit website **http://coolant-unit.nopgroup.com/en/**

NOP® COOLANT UNIT Features of ET・ES

An All-in-one, Medium Pressure Coolant Unit

All components of a coolant system are consolidated into a single unit. No in-line and suction filters are required. The use of NOP coolant unit reduces the required space to about 1/20th by volume of that occupied by a conventional coolant system. The saved space expands the available plant space, resulting in a higher production efficiency.

- Maximum operating pressure: 2.0 MPa
- Maximum flow rate: 28.8 liters/min
- No suction filter is required
- No in-line filter is required
- No clean tank is required
- No transfer pump is required on the coolant tank end
- No plumbing is required to interconnect various components

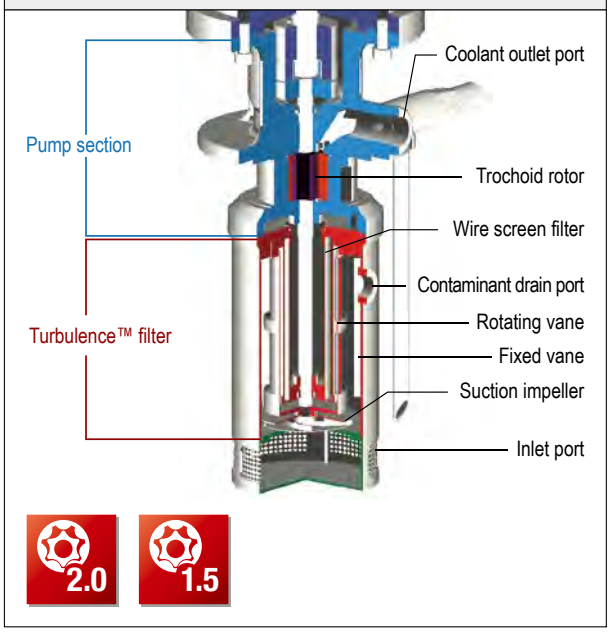
Turbulence™ Filter

Our special Turbulence™ design generates turbulence around the surface of filter with 2 wing-shaped vanes rotating around filter and can wash away swarf from filter surface continuously.

High efficiency Trochoid™ pump

- Compatible fluid type
  - Water-soluble cutting fluids, straight oils
  - 20 μm elemnt is applicable to fluids with kinematic vicosity of 15 mm^2/s or less, 50 μm element is applicable to fluids with kinematic vicosity of 32 mm^2/s or less (Maximum kinematic vicosity : 32 mm^2/s or less)
  - Not for lubricant oils or fuel oils
  - Not for clear water, demineralised water, aqueous solutions and viscous fluids without rust-preventive property, corrosive fluids, solvents
- Relief valve is built into the unit

Trochoid™ Pump

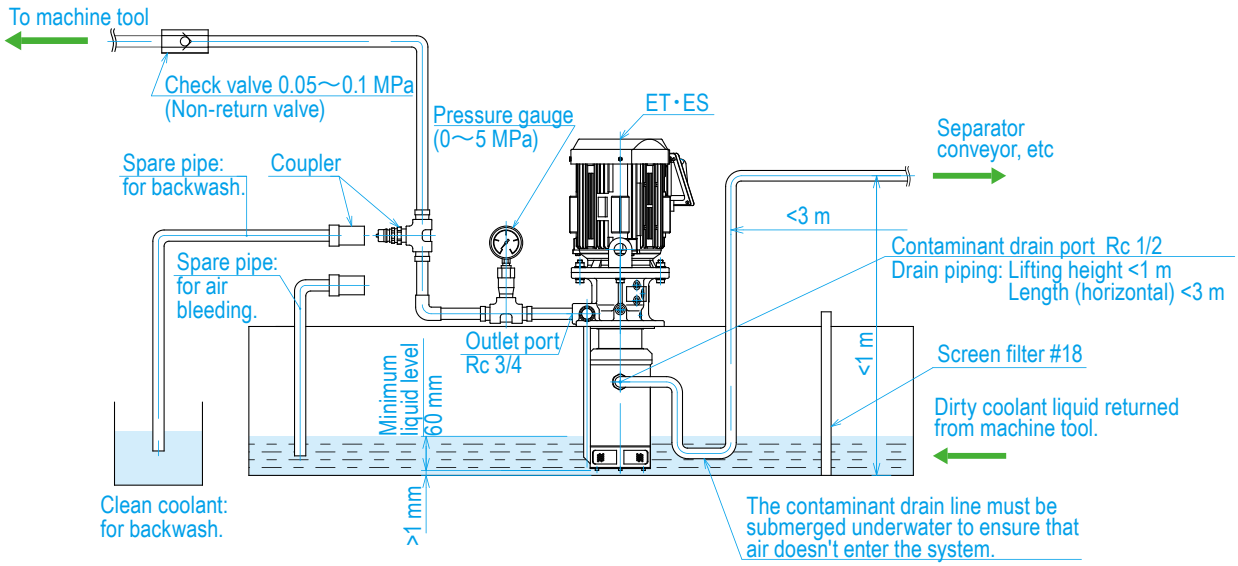


Filtration performance (Nominal value)

Suction strainer	3 mm (Solids larger than this must be removed from the tank)
Filter	20 μm, 50 μm

※Please consult us if you use straight oils as it can be used in limited conditions.

A Sample System Layout



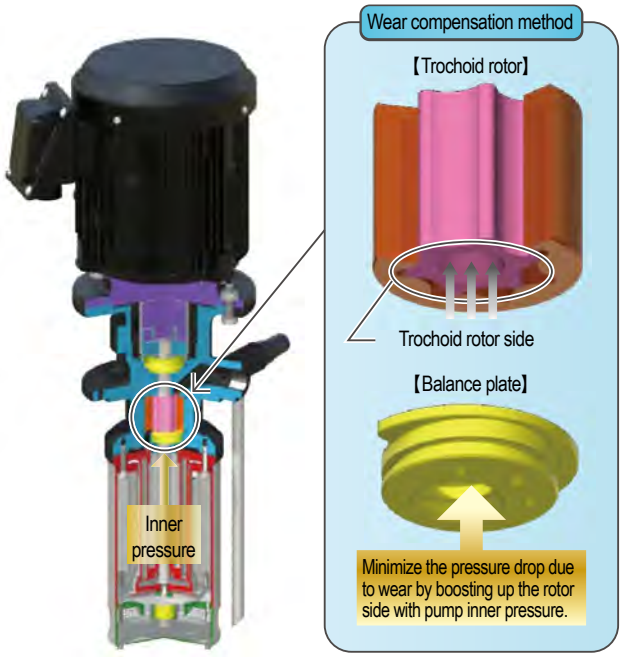
ES type (Wear resistance)

For its special wear resistant structure, ES type can be installed on coolant tanks of machines which are machining materials which generate hard and abrasive swarf.

■ Balance plate
Pump generates inner pressure to press the balance plate toward the Trochoid rotor side, which helps in reducing the clearance created due to wear and thereby minimize the pressure drop, ensuring desired performance for a longer time

■ Shaft and bearing reinforcement
Improved wear resistance by employing sprayed ceramic on shaft bearing area and usage of ceramic bearing

■ Double seal & cartridge system
Seal Area is reinforced to prevent leakage and Cartridge system ensures ease of replacement



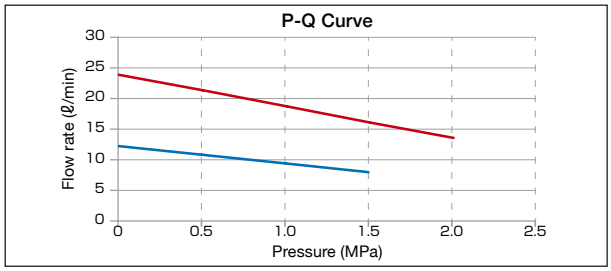
■ Performance Curves of ET

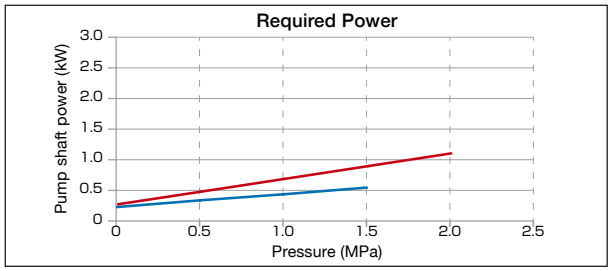
Water-soluble coolant (general performance)

Oil used: JIS K2241, Type A3 solution containing 2% water-soluble cutting fluid

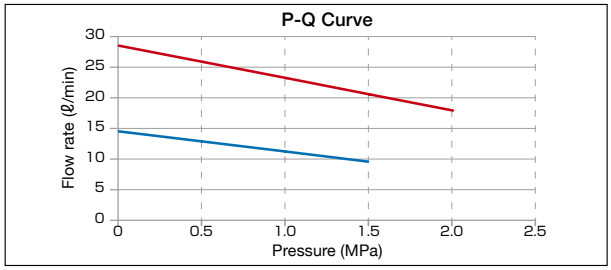
ET208
ET216

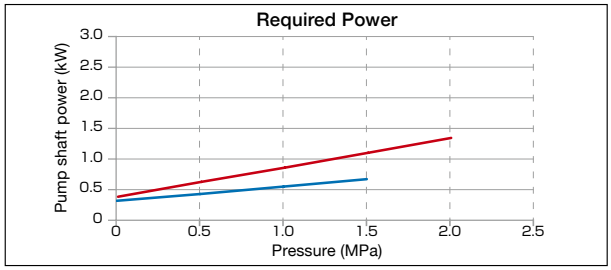
50 Hz





60 Hz



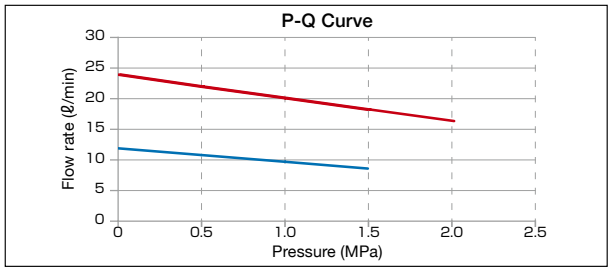


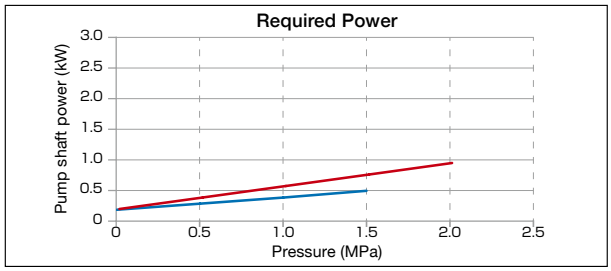
Spindle Oil (general performance)

Oil used: ISO VG2 equivalent

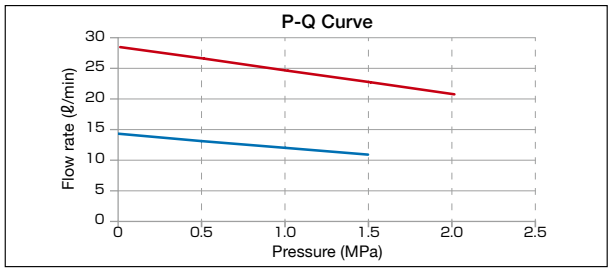
ET208
ET216

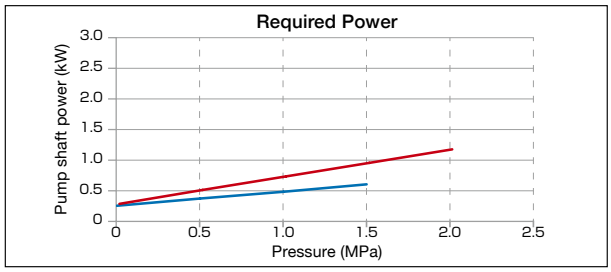
50 Hz





60 Hz





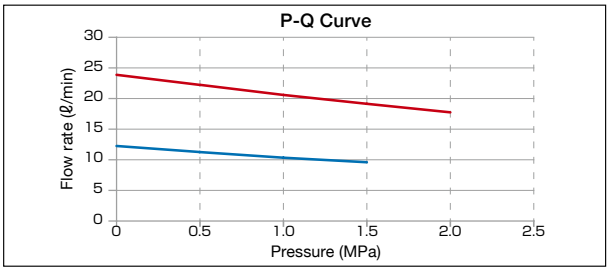
■ Performance Curves of ES

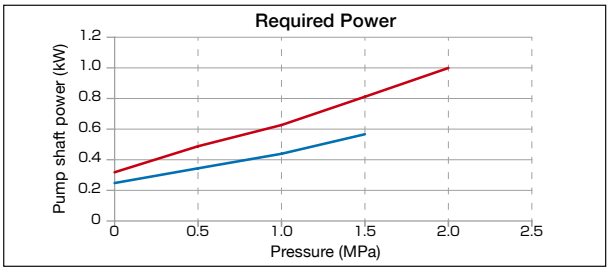
Water-soluble coolant (general performance)

Oil used: JIS K2241, Type A3 solution containing 2% water-soluble cutting fluid

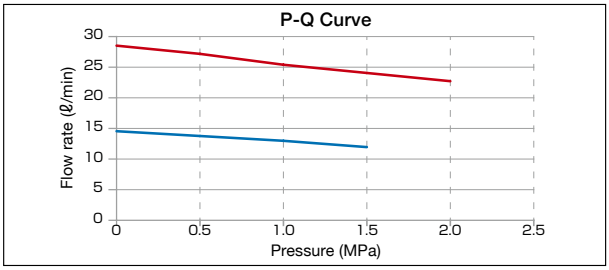
ES208
ES216

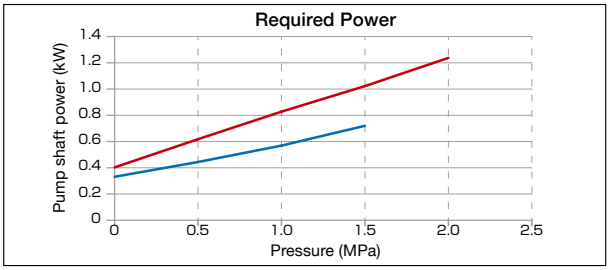
50 Hz





60 Hz



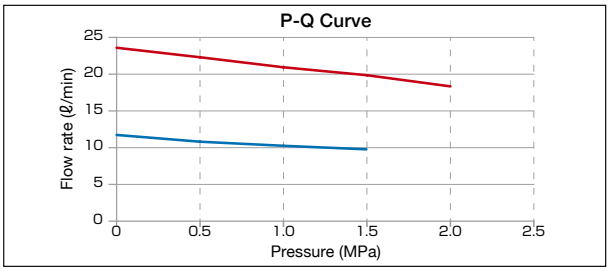


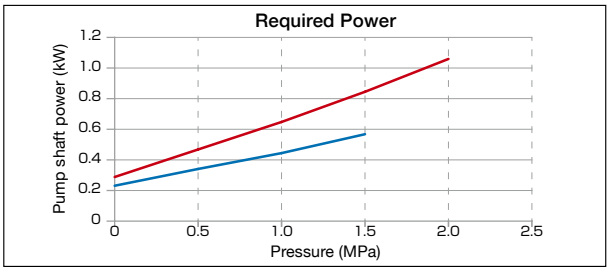
Spindle Oil (general performance)

Oil used: ISO VG2 equivalent

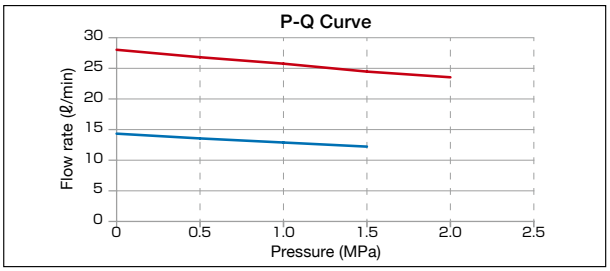
ES208
ES216

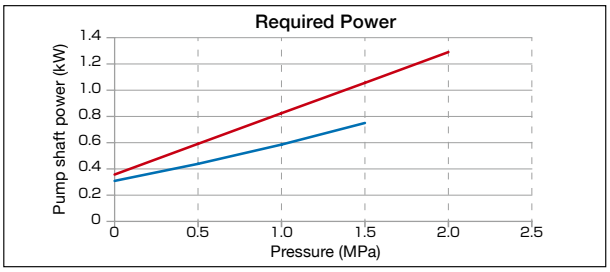
50 Hz



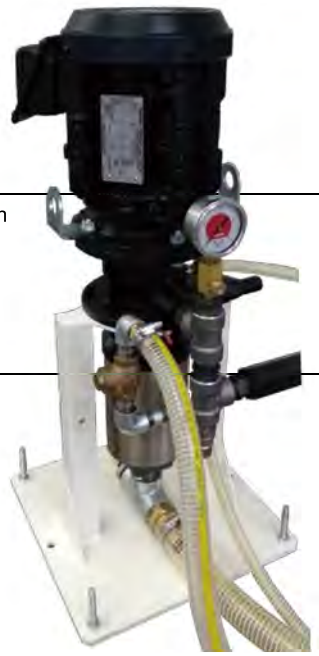


60 Hz





Line type

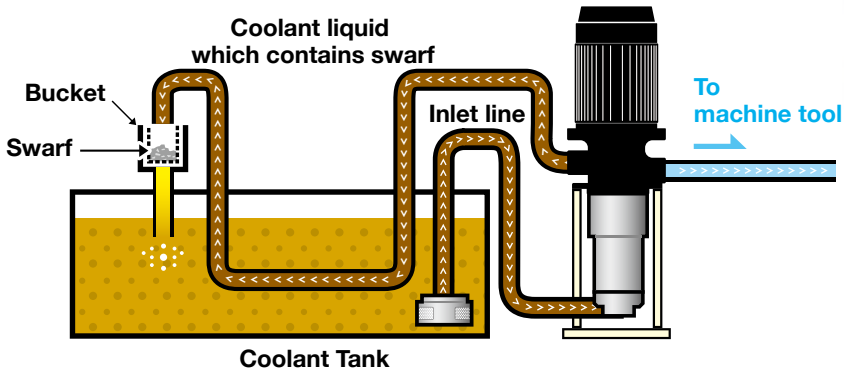


NOP coolant unit external type

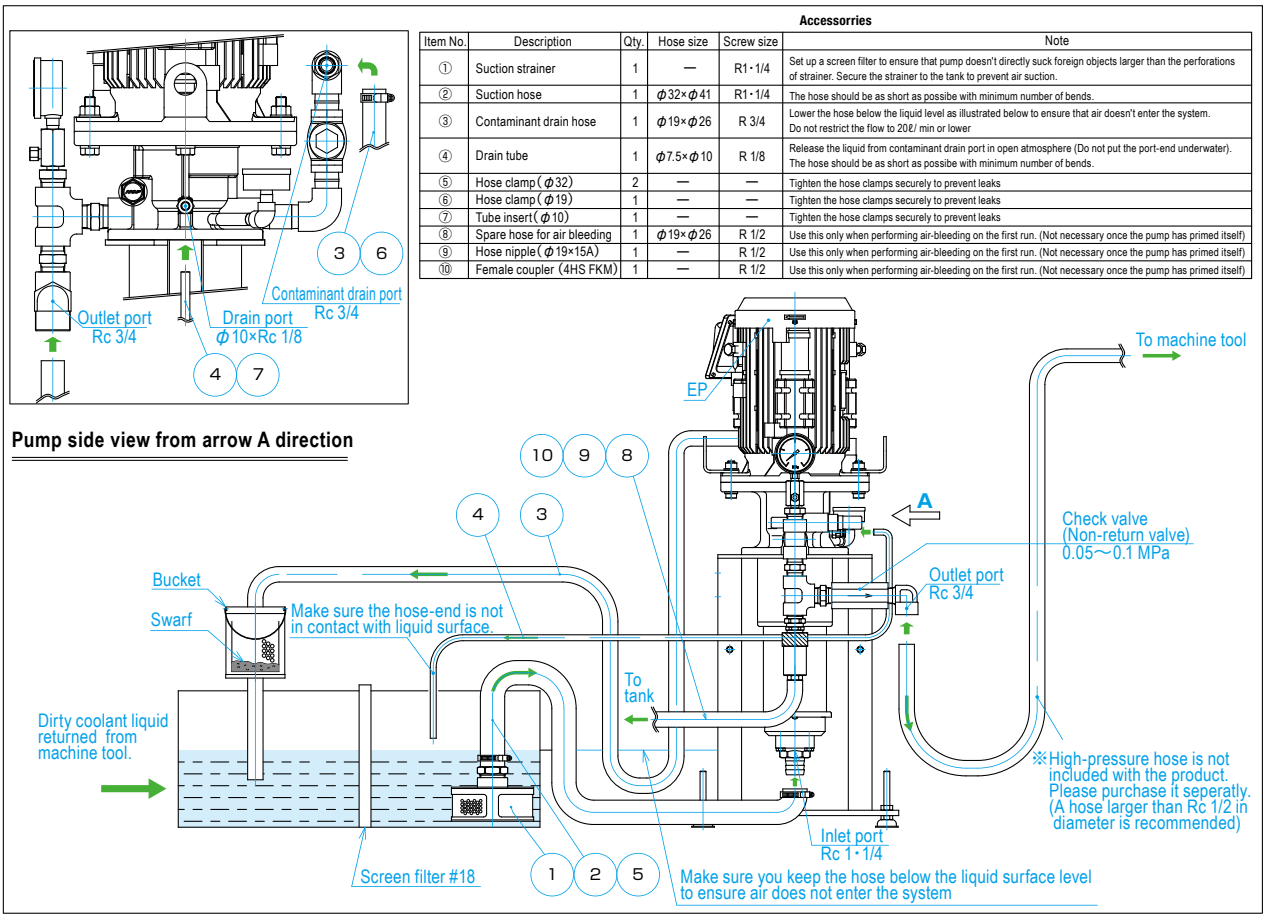
This self-priming external type NOP coolant unit could supply high-to-medium pressure coolant from a distant place by using exteded pipes and hoses.
Alteration of the tank cover is no longer necessary, ensuring easy retrofit of through-coolant system.

Compatible models

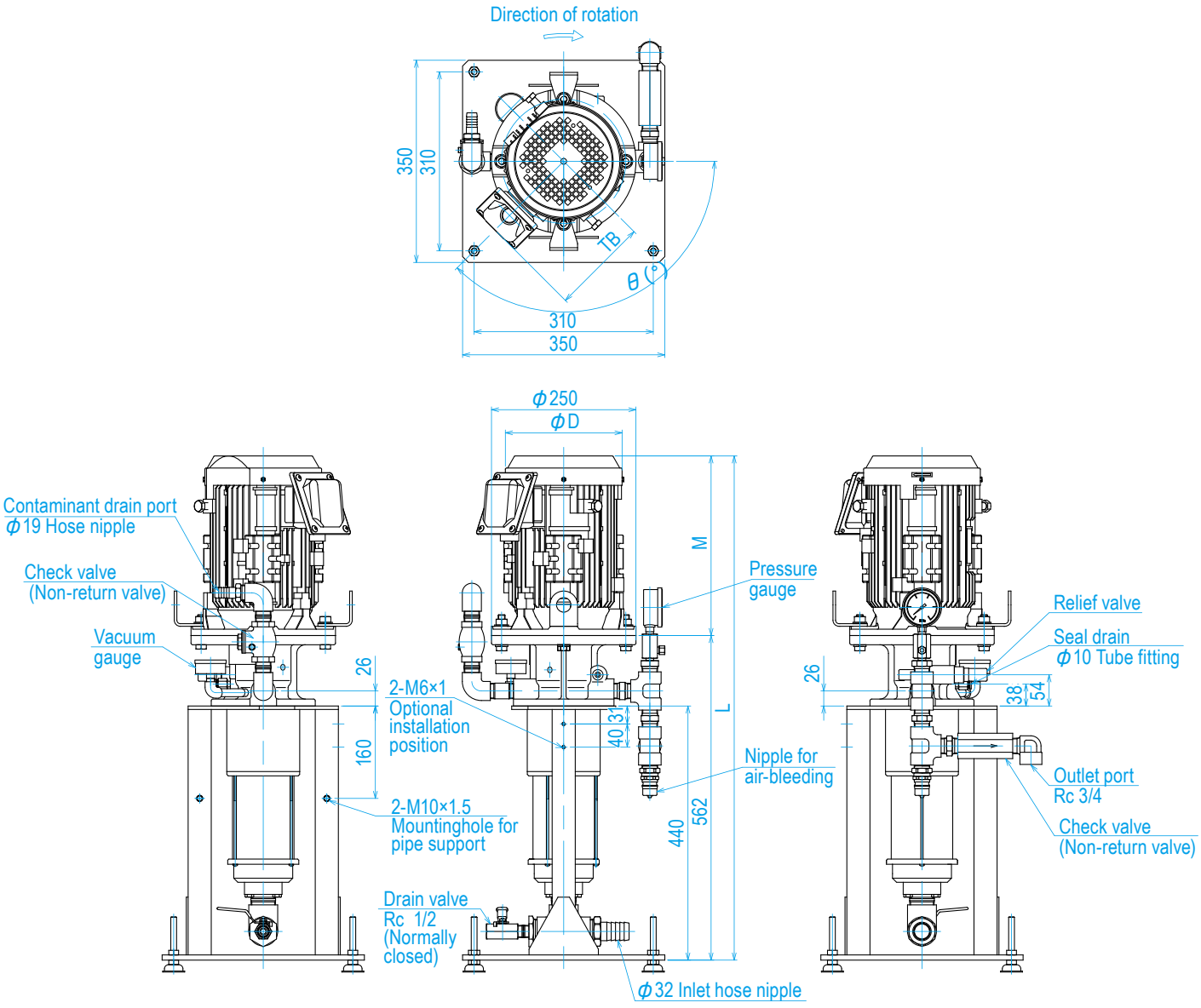
E series EP, ET, ES
※Please refer to previous pages for further specifications on each model above.



A Sample System Layout EP Line Type



■ Dimensional Drawing EP Line Type
(Typical / Motor type : A3)

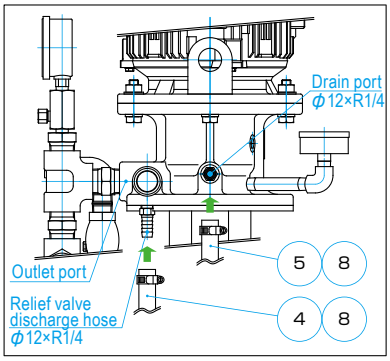


(mm)

Model	L	M	ϕD	θ(°)	TB
YTH2200A3-P008EVD70∗L	873	311	202	135	168
YTH2200A3-P010EVD∗∗L	873	311	202	135	168
YTH2200A3-P016EVD∗∗L	873	311	202	135	168
YTH3700A3-P014EVD70∗L	888	326	243	135	187
YTH3700A3-P016EVD∗∗L	888	326	243	135	187

※ **Drawings in PDF** Drawings can be downloaded from NOP coolant unit website **http://coolant-unit.nopgroup.com/en/**

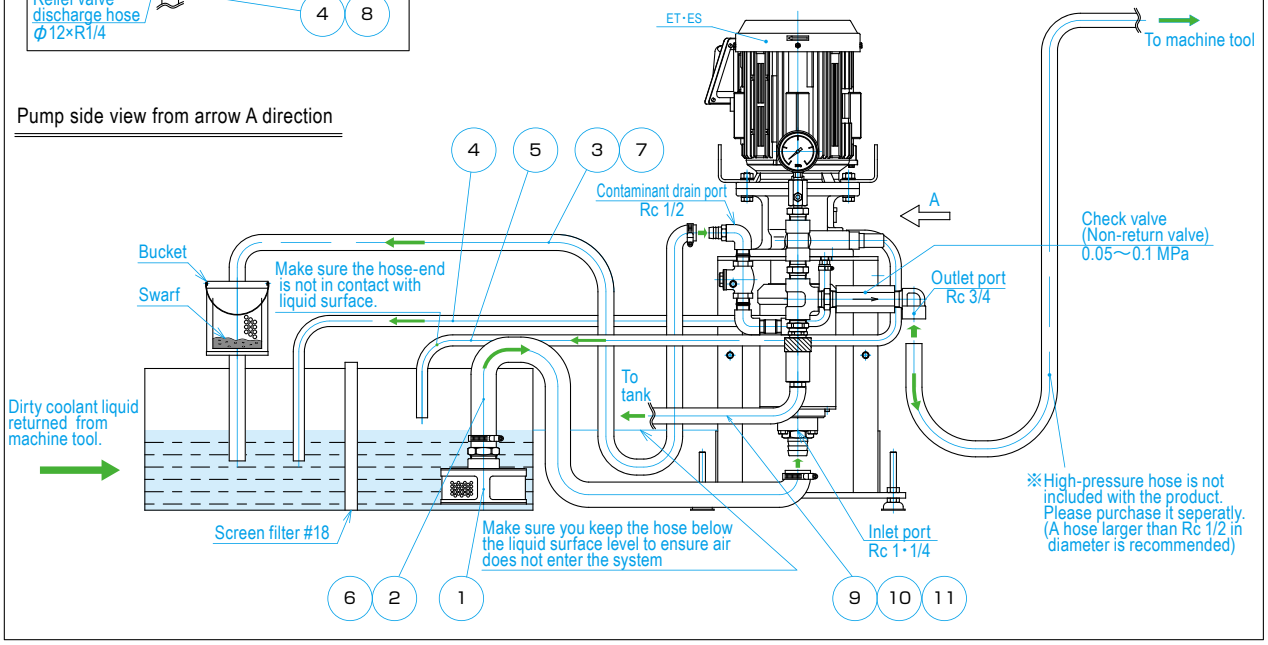
A Sample System Layout ET·ES Line Type



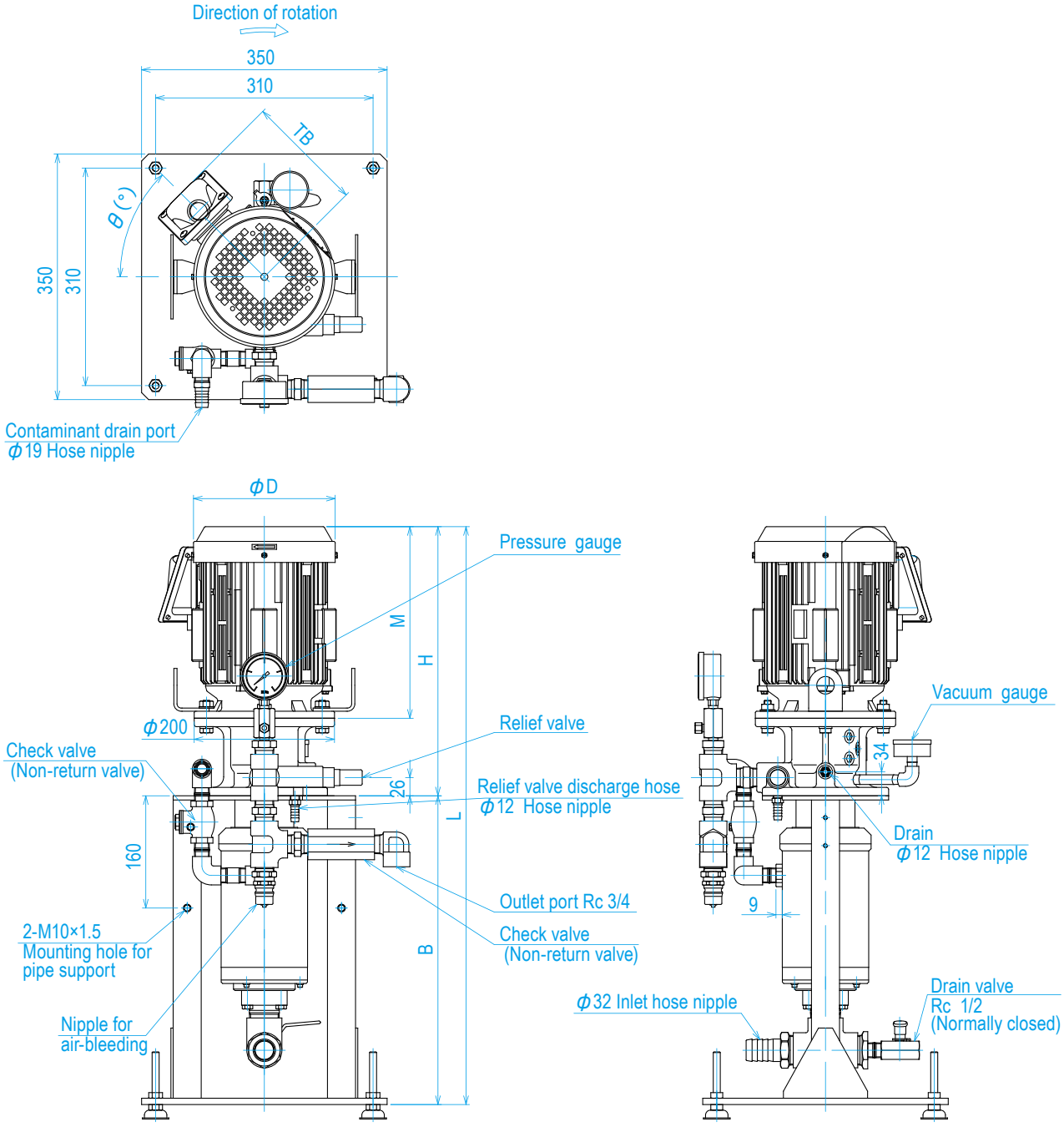
Accessorries

Item No.	Description	Qty.	Hose size	Screw size	Note
①	Suction strainer	1	—	R1・1/4	Set up a screen filter to ensure that the pump doesn't directly suck objects larger than the perforations of strainer. Secure the strainer to the tank to prevent air suction.
②	Suction hose	1	φ32×φ41	R1・1/4	The hose should be as short as possibe with minimum number of bends.
③	Contaminant drain hose	1	φ19×φ26	R 1/2	Lower the hose below the liquid level as illustrated below to ensure that air doesn't enter the system. Do not restrict the flow to 20 ℓ/ min or lower
④	Relief valve discharge hose	1	φ12×φ18	R 1/4	To prevent foam generation, make sure that the hose-end is dipped into the liquid. It is also imperative that it be located far enough from pump suction area.
⑤	Drain tube	1	φ12×φ18	R 1/4	Release the liquid from contaminant drain port in open atmosphere (Do not put the port-end underwater). The hose should be as short as possibe with minimum number of bends.
⑥	Hose clamp(φ32)	2	—	—	Tighten the hose clamps securely to prevent leaks
⑦	Hose clamp(φ19)	1	—	—	Tighten the hose clamps securely to prevent leaks
⑧	Hose clamp(φ12)	2	—	—	Tighten the hose clamps securely to prevent leaks
⑨	Spare hose for air bleeding	1	φ19×φ26	R 1/2	Use this only when performing air-bleeding on the first run. (Not necessary once the pump has primed itself)
⑩	Hose nipple(φ19×15A)	1	—	R 1/2	Use this only when performing air-bleeding on the first run. (Not necessary once the pump has primed itself)
⑪	Female coupler (4HS FKM)	1	—	R 1/2	Use this only when performing air-bleeding on the first run. (Not necessary once the pump has primed itself)

Pump side view from arrow A direction



■ Dimensional Drawing ET·ES Line Type
(Typical / Motor type : A3)



(mm)

Model	L	B	H	M	φD	θ(°)	TB
YTH750A3-T208EVD15★L	756	392	364	253.5	170	30	151
YTH1500A3-T216EVD★★L	775.5	392	383.5	273	202	45	168
YTH750A3-S208EVD15★L	756	392	364	253.5	170	30	151
YTH1500A3-S216EVD★★L	823.5	440	383.5	273	202	45	168

※ **Drawings in PDF** Drawings can be downloaded from NOP coolant unit website **http://coolant-unit.nopgroup.com/en/**

CASE

Cyclone Model

NOP® COOLANT UNIT

with Built-in Cyclone Filter

CT

Trochoid™-type
Medium-pressure Coolant Unit

Double-cyclone filter

Two layers of double cyclones (one large cyclone and six small cyclones) remove swarf from the coolant fluid.

Trochoid™ pump/ 2.0 MPa, 1.5 MPa

A rotor turning in a trochoidal curve generates pressure to suck and discharge fluid. This is an extremely efficient self-priming pump.

Compatible with the TAZUNA™ fluid control system (software)

TAZUNA™ reduces the electric power cost further by approximately 20%.
The pressure and flow rate are automatically adjusted.

■ Model Numbering System

TOP–YTH ① ② - ③ C VD ④

① Motor capacity	750: 0.75 kW	
	1500: 1.5 kW	
② Motor type*	Standard motor	A3: AC 200/200/220/230 V 50/60/60/60 Hz 3 phase electric induction motor (IE3) with CE marking
	Local motor	AE: supplied by NOP Deutschland (Germany) AF: supplied by NOP Taiwan AJ: supplied by NOP Asia (China) AK: supplied by NOP India

③ Rotor capacity	T208: Trochoid™ pump, 8 cc/rev
	T216: Trochoid™ pump, 16 cc/rev
Filtering method	C: Double-cyclone type
Relief valve	VD: External return type
④ Relief pressure setting	20 : 2.0 MPa
	15 : 1.5 MPa

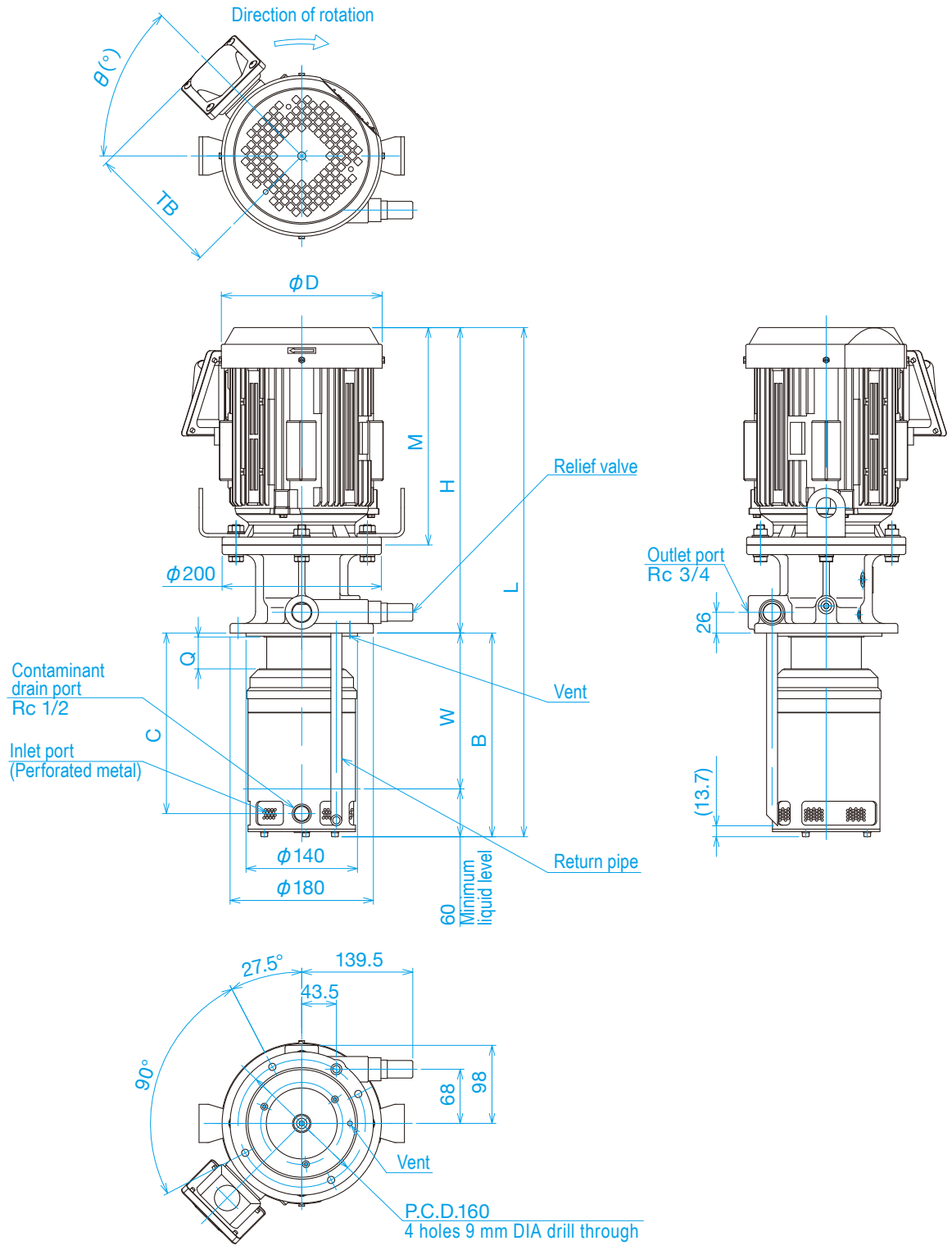
* For further details about the local motor, please contact our overseas branch or subsidiaries.

■ Specifications

Item / Model	Motor capacity (kW)	Flow rate (ℓ/min) 50 Hz / 60 Hz	Maximum pressure (MPa)	Approximate weight (kg)
YTH750A3-T208CVD*	0.75	12.0 / 14.4	2.0	34
YTH1500A3-T216CVD*	1.5	24.0 / 28.8		39

* ④Relief pressure setting

■ Dimensional Drawing (Typical / Motor type : A3)



(mm)

Model	L	B	C	W	Q	H	M	φD	θ(°)	TB
YTH750A3-T208CVD**	599.7	235.7	206.7	175.7	20	364	253.5	170	30	151
YTH1500A3-T216CVD**	639.2	255.7	226.7	195.7	40	383.5	273	202	45	168

※ **Drawings in PDF** Drawings can be downloaded from NOP coolant unit website **http://coolant-unit.nopgroup.com/en/**

NOP® COOLANT UNIT Features of CT

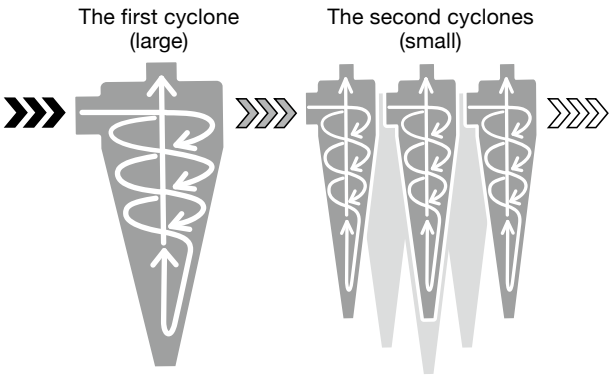
All-in-one Medium-pressure Coolant Pump

All components of a coolant system are consolidated into a single unit. By simply replacing a conventional medium-pressure pump with CT, the occupied space could be reduced to 1/20th by volume. The saved space expands the available plant space, resulting in a higher production efficiency.

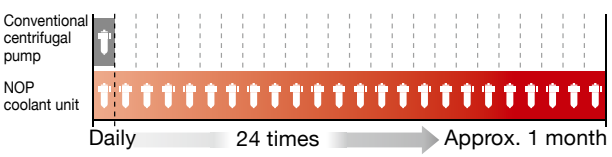
- Maximum operating pressure: 2.0 MPa
- Maximum flow rate: 28.8 liters/min
- No suction filter is required
- No clean tank is required
- Applicable only to continuous running (intermittent running is not applicable)
- No transfer pump is required on the coolant tank end
- No plumbing is required to interconnect various components

1+6 Double-cyclone Filter

A proprietary double-cyclone system removes swarf※.
The first cyclone removes larger debris, while the second cyclones remove smaller particles. The line-filter cleaning cycle is extended by 24 times.
※Swarf larger than 20 μm can be removed (When using water-soluble coolant fluid).



Line-filter cleaning become once a month (On average)

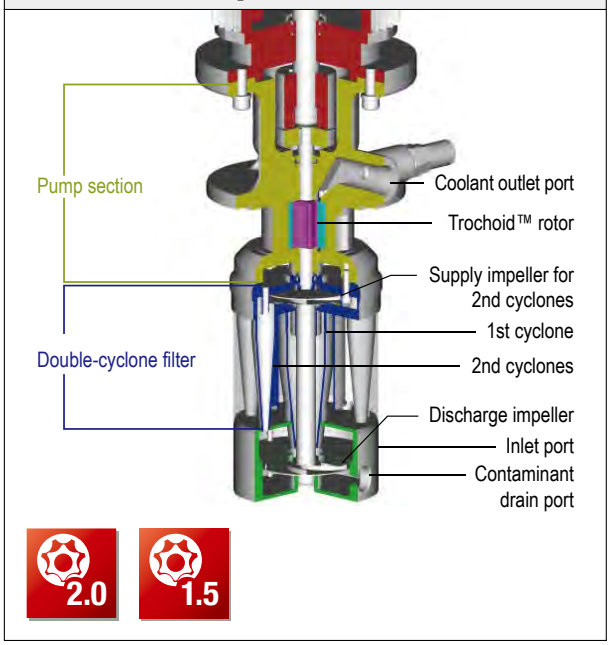


High-efficiency Trochoid™ Pump

CT employs a Trochoid™ pump which excels in fluid control efficiency. The double-cyclone system sorts out swarf and enables direct connection to the coolant tank.

- Compatible fluid type
  - Water-soluble cutting fluids
  - Not for straight oils, lubricant oils or fuel oils
  - Not for clear water, demineralised water, aqueous solutions and viscous fluids without rust-preventive property, corrosive fluids, and solvents
- Relief valve is built into the unit

Trochoid™ Pump

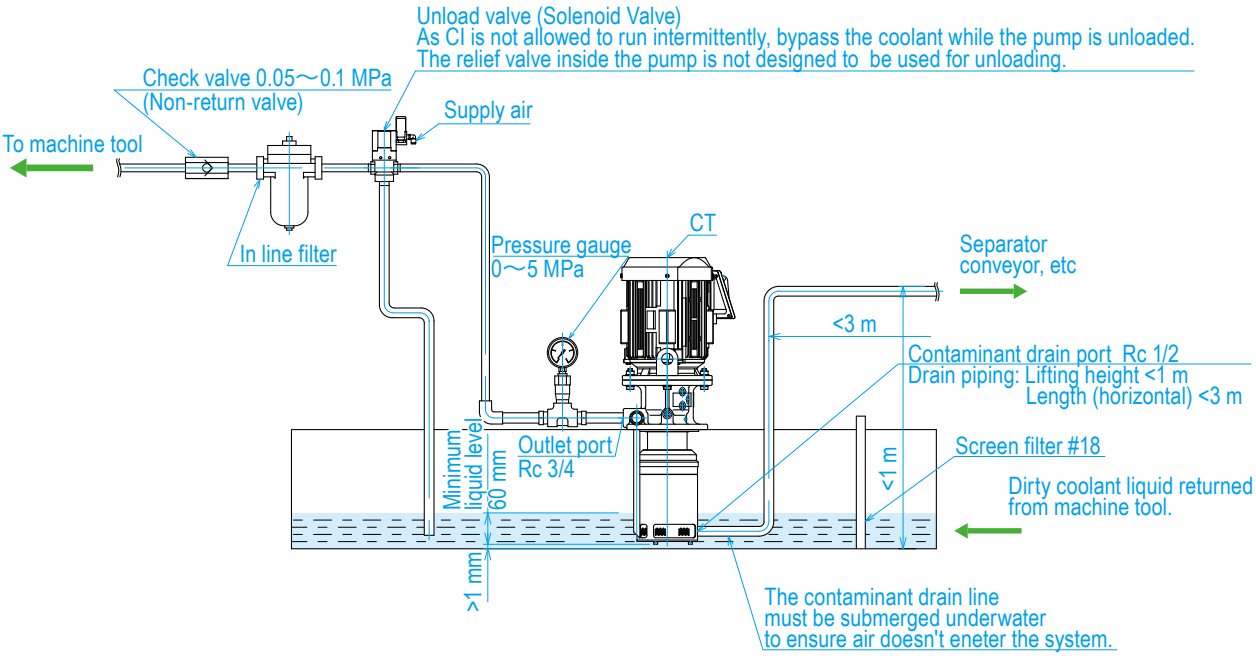


Filtration performance (Nominal value)

Suction strainer	3 mm (Solids larger than this must be removed from the tank)
Filter	**Water-soluble coolant fluid** 50 μm: 95% (Specific weight 2.7) 100 μm: 99.9% (Specific weight 2.7)

※The filtration performance above can only be achieved when running the pump continuously. (Intermittent running is not allowed)

A Sample System Layout



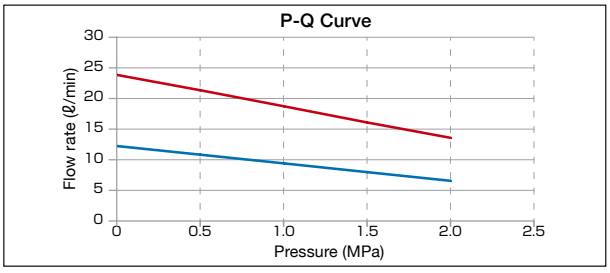
■ Performance Curves

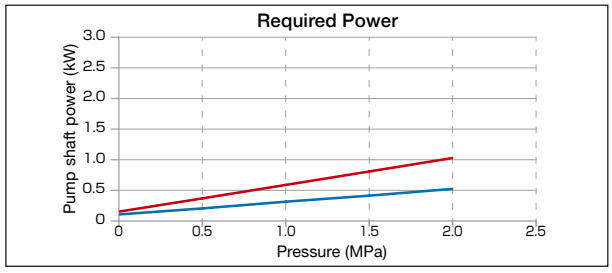
Water-soluble coolant (general performance)

Oil used: JIS K2241, Type A3 solution containing 2% water-soluble cutting fluid

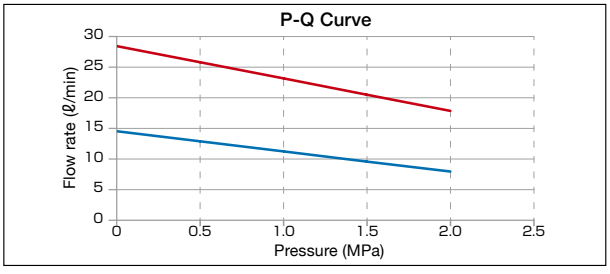
CT208
CT216

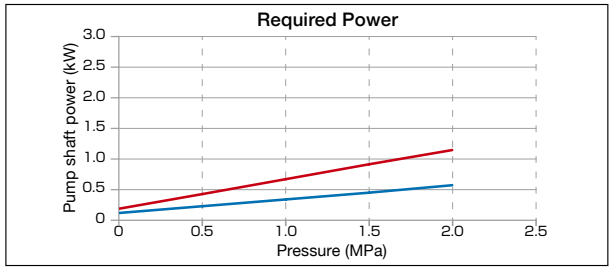
50 Hz





60 Hz





CI

Large-flow Low-pressure Coolant Unit

Cyclone filter

The cyclone system sorts out swarf from the coolant fluid.

Impeller pump

Centrifugal mechanism generates pressure to supply a large flow coolant.
This is a large flow transfer pump.

■ Model Numbering System

TOP–YTH ① ② - ③ C

① **Motor capacity**	1500: 1.5 kW
	3700: 3.7 kW
② **Motor type**	AC: AC 200/200/220/230 V 50/60/60/60 Hz 3 phase electric induction motor (IE3) with CE marking

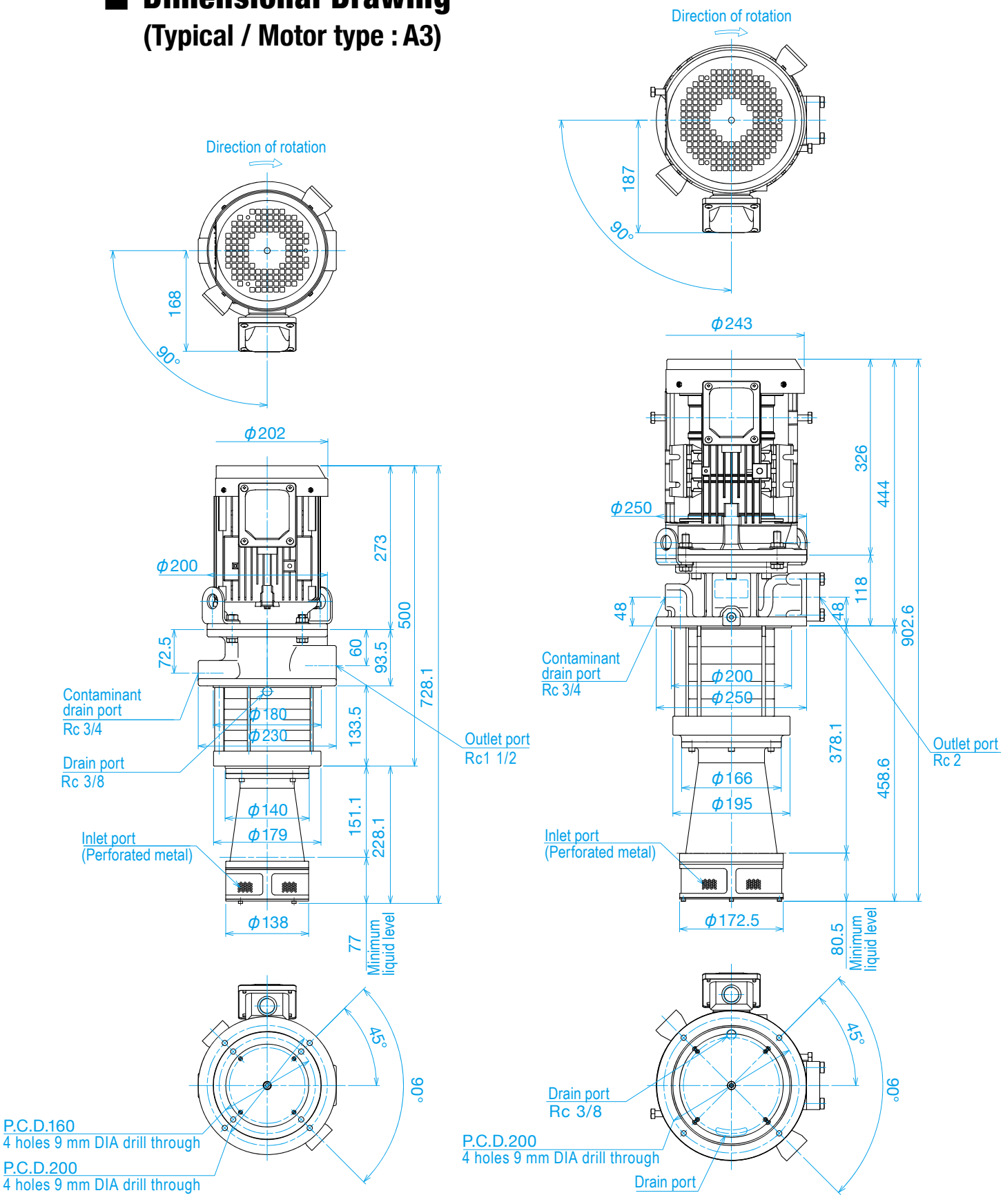
* I155・I305 are not applicable to 60 Hz

③ **Flow rate***	50 Hz	I155: Impeller pump (5 stages/150 ℓ)
	60 Hz	I152: Impeller pump (2 stages/150 ℓ)
	50 Hz	I305: Impeller pump (5 stages/300 ℓ)
	60 Hz	I302: Impeller pump (2 stages/300 ℓ)
Filtering method		C: cyclone type

■ Specifications

Model / Item		Motor capacity (kW)	Flow rate (ℓ/min)	Total pump head (m)	Approximate weight (kg)
50 Hz	YTH1500AC-I155C	1.5	150	55	43
60 Hz	YTH1500AC-I152C			40	
50 Hz	YTH3700AC-I305C	3.7	300	55	70
60 Hz	YTH3700AC-I302C			40	69

■ Dimensional Drawing
(Typical / Motor type : A3)



(mm)

※ **Drawings in PDF** Drawings can be downloaded from NOP coolant unit website **http://coolant-unit.nopgroup.com/en/**

NOP® COOLANT UNIT　Features of CI

Large-flow Low-pressure Coolant Unit

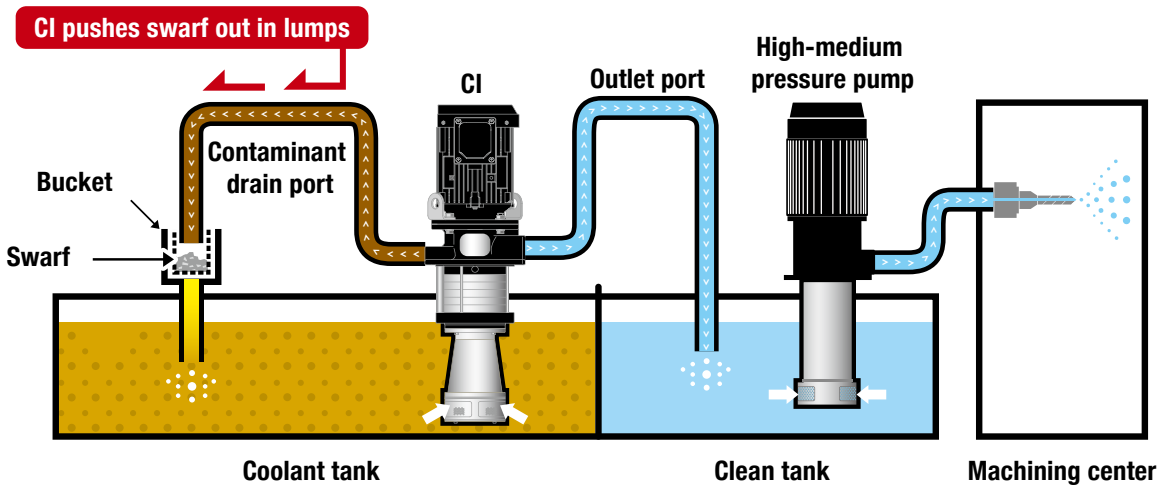
This is a model corresponding to large flow and low pressure with cyclone filter. CI's compact design enables to retrofit the exisiting tank easily.
The large-flow also ensures high efficiency in swarf removal, which substancially reduces troubles around the tank, such as dimensional deviation of workpieces, clogged plumbing due to excessive swarf accumulation.

■ Total pump head：40-65 m
■ Maximum flow rate：CI 15*C：150 ℓ/min
　　CI 30*C：300 ℓ/min

■ Application examples

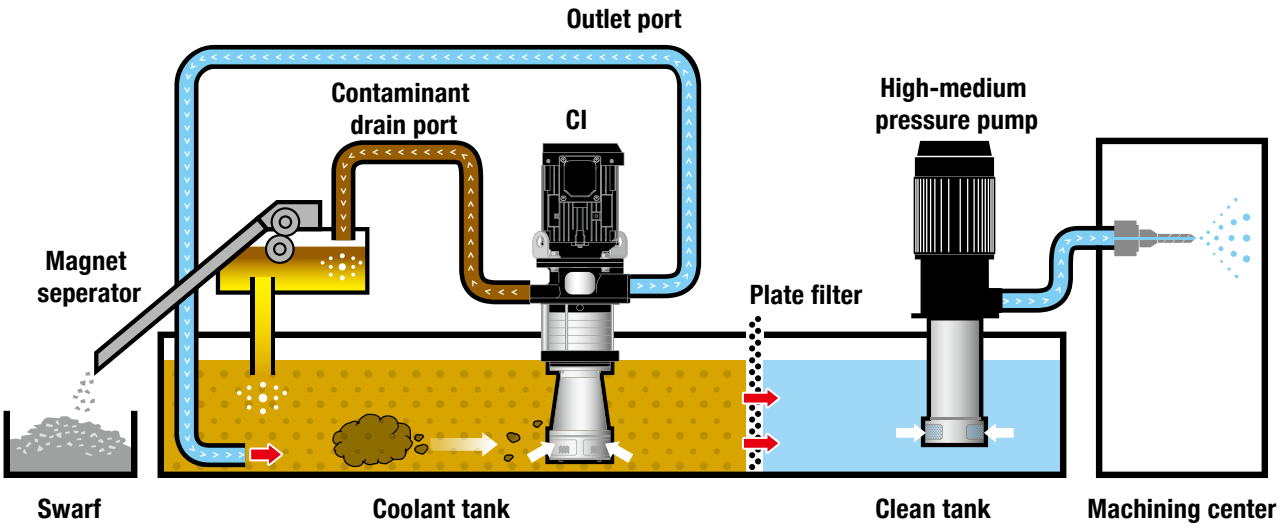
Plan-A　To transfer coolant to an isolated clean tank

CI transfers cleaned coolant from a coolant tank to an isolated clean tank. A plate filter is no longer necessary between the tanks so the users can be free from the plate filter cleaning. CI can also reduce maintenance of coolant with its built-in cyclone system which can seperate swarf from the coolant and discharge from contaminant drain port, so swarf can be simply collected with a bucket.



Plan-B For tank cleaning ①

CI can be an excellent tank cleaner by creating a flow circulation with outlet flow, that allows CI to stir up sediment on the tank floor and eliminate swarf effectively.

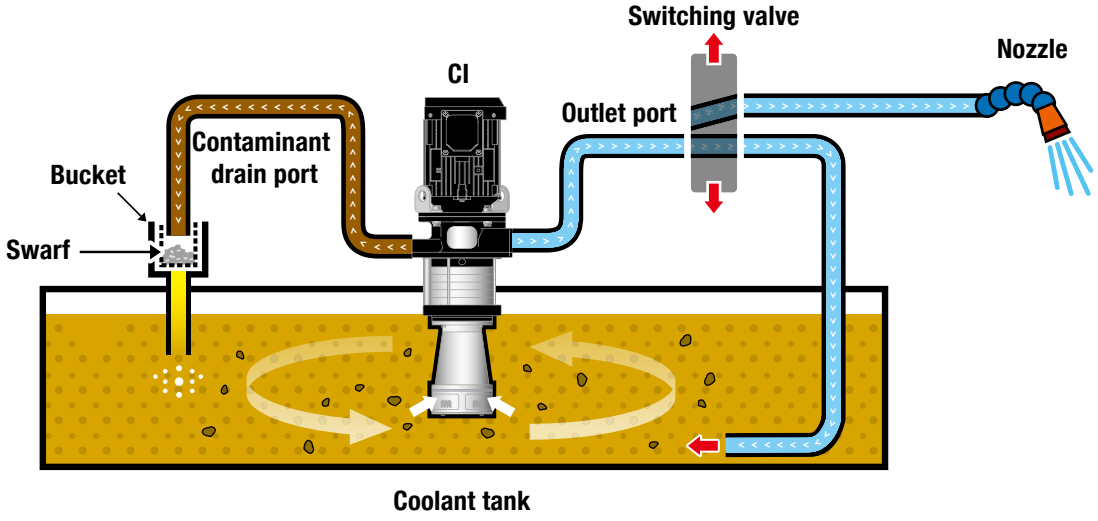


Plan-C For tank cleaning ②

CI supplies cleaned coolant directly to nozzles in a machine tool.
While the machine is not in operation, CI can also eliminate swarf very effectively just by routing the outlet line back to the tank with a switching valve and agitate the coolant vigorously.

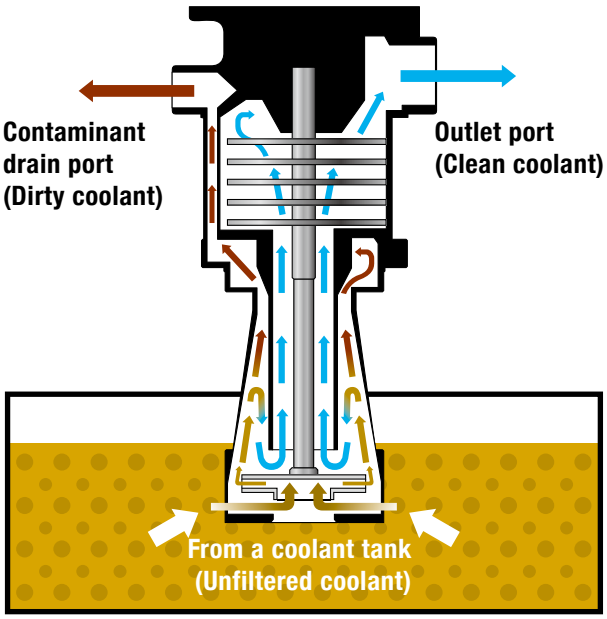
【CI can play 3 different roles】

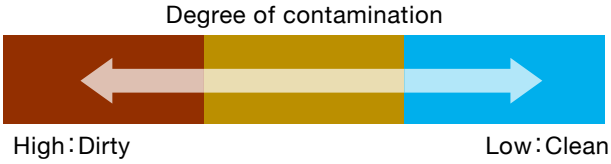
- ■ Coolant transfer：Cleaned coolant is supplied at all times, decreasing the risks of swarf cloggings, damaged workpieces or tools and total machine stoppage time can be reduced.
- ■ Reduction in tank maintenance : It can effectively collect swarf in a coolant tank.
- ■ Agitation of coolant ：Proper coolant agitation with CI can delay growth of anaerobic bacteria in a coolant.



Cyclone filter

This unique reversed cyclone system enables to separate clean coolant and dirty coolant. Dirty coolant is pushed up through side surface of cyclone filter by centrifugal force and discharged with swarf. Clean coolant are collected to center of cyclone filter and boosted up by multiple-stage impellers.





Filtration performance (Nominal value)

Suction strainer	3 mm (Solids larger than this must be removed from the tank)
Cyclone filter	**Water soluble coolant** 100 µm: 99.9% (Specific weight 2.7) **Straight oil** 100 µm: ≤80% (Specific weight 2.7)

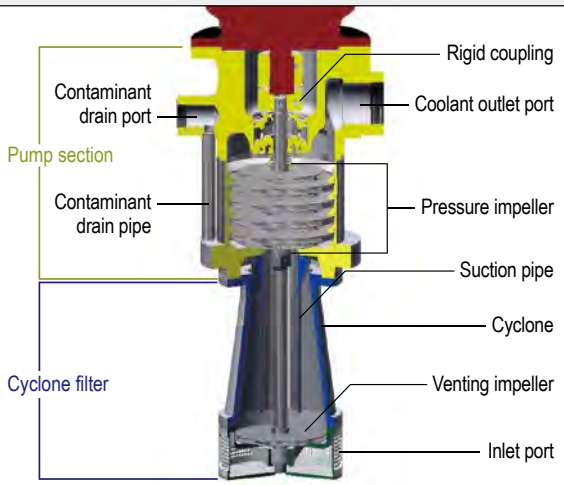
Impeller Pump

CI adopts impeller pump whose design is best suited for supplying large quantity of coolant and capable of boosting up pressure with its multiple stage impellers.

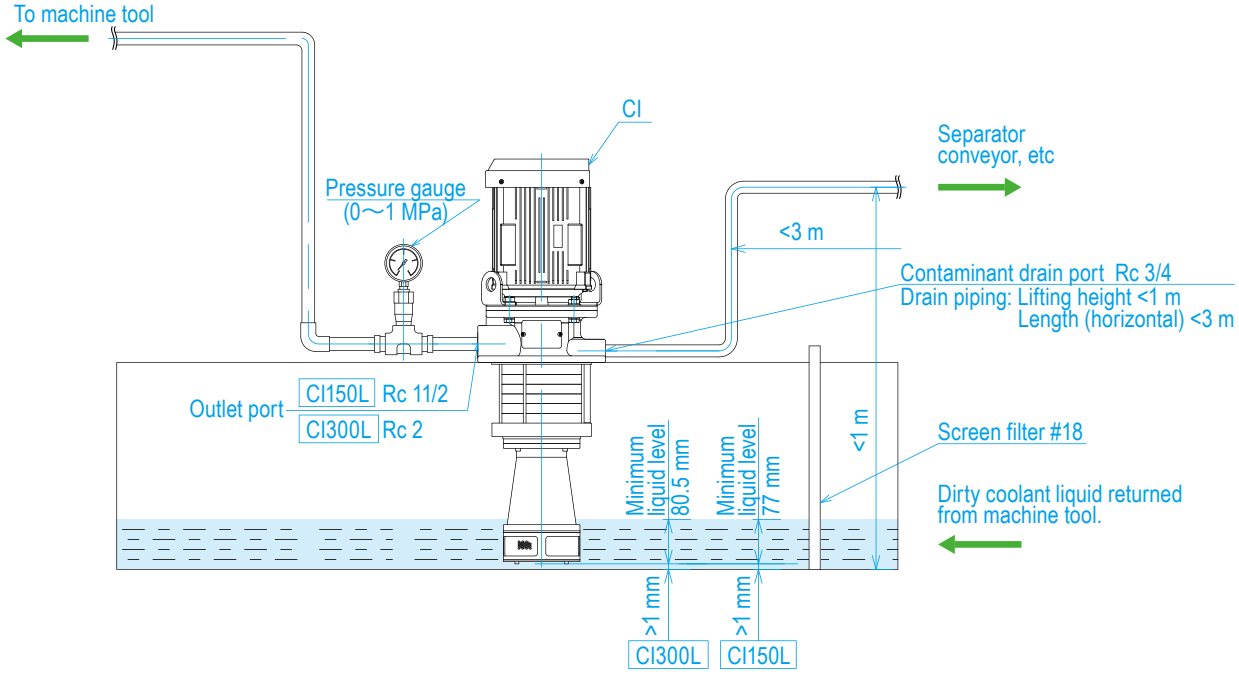
■ Compatible fluid type

- Water-soluble cutting fluids, straight oils with kinematic viscosity of 22 mm^2/s or less
- Not for lubricant oils or fuel oils
- Not for clear water, demineralised water, aqueous solutions and viscous fluids which do not offer rust-protection, corrosive fluids and solvents

Impeller Pump



A Sample System Layout



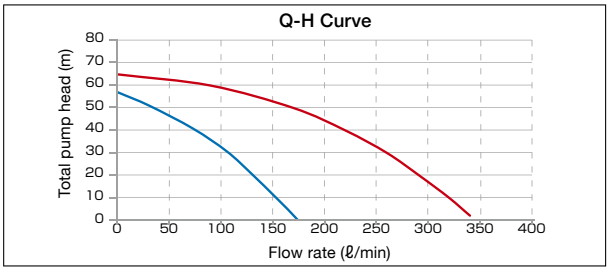
■ Performance Curves

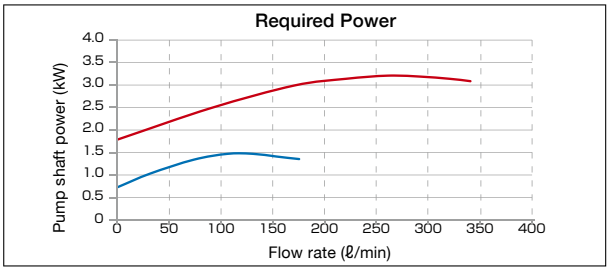
Water-soluble coolant (general performance)

Oil used: JIS K2241, Type A3 solution containing 2% water-soluble cutting fluid

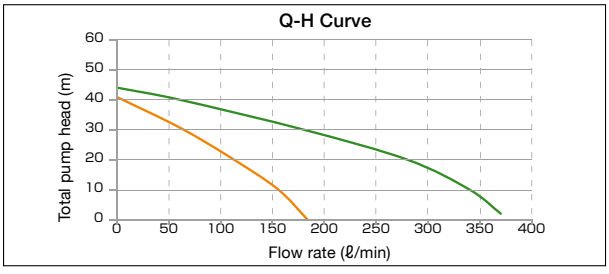
CI155C CI305C
CI152C CI302C

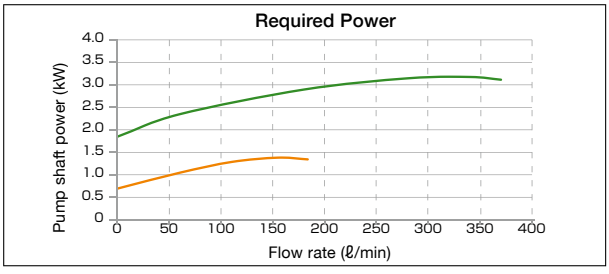
50 Hz

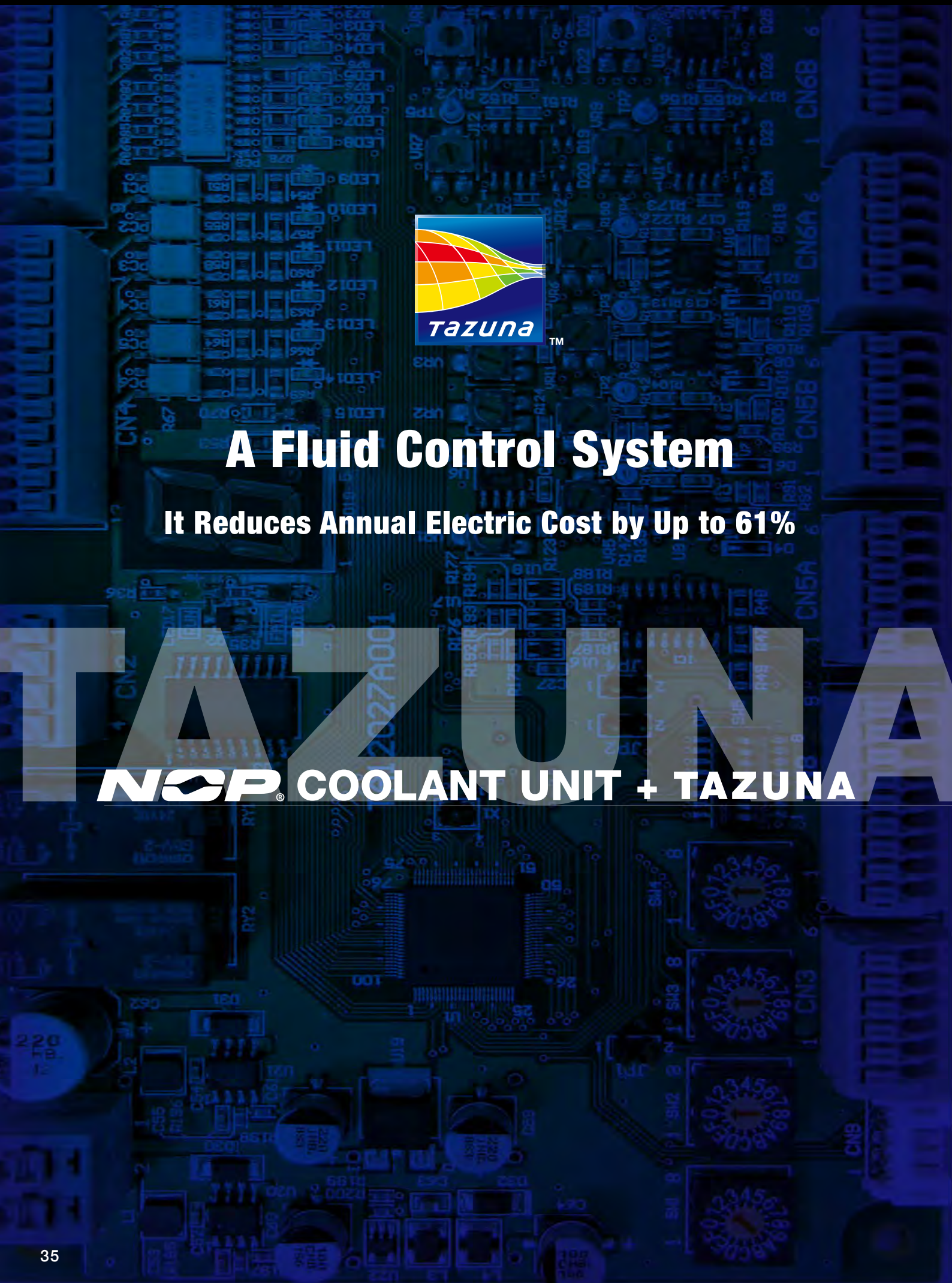




60 Hz



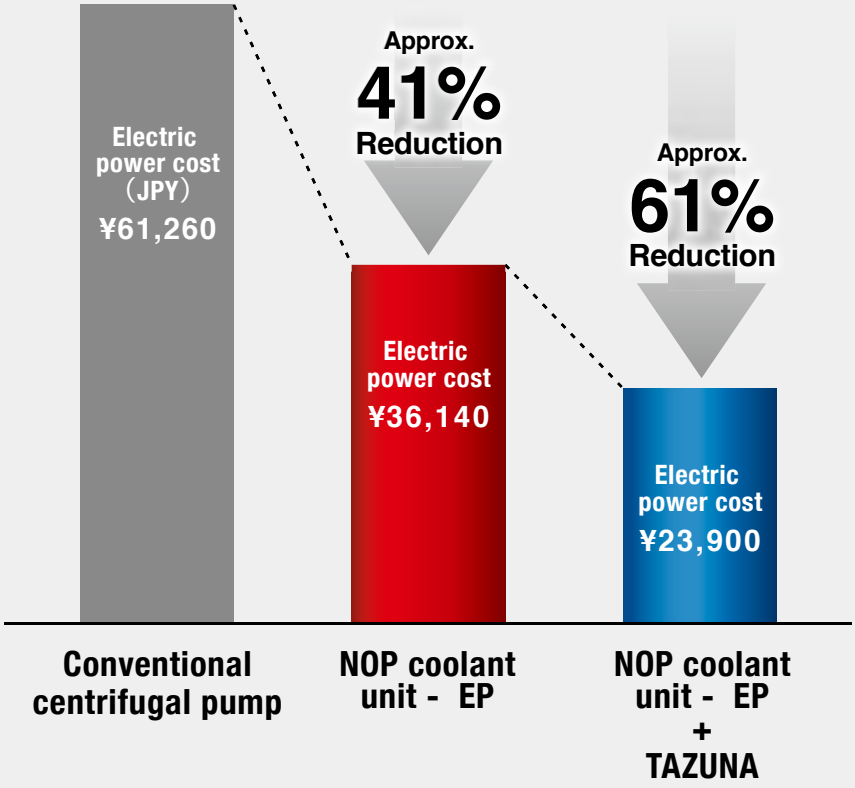


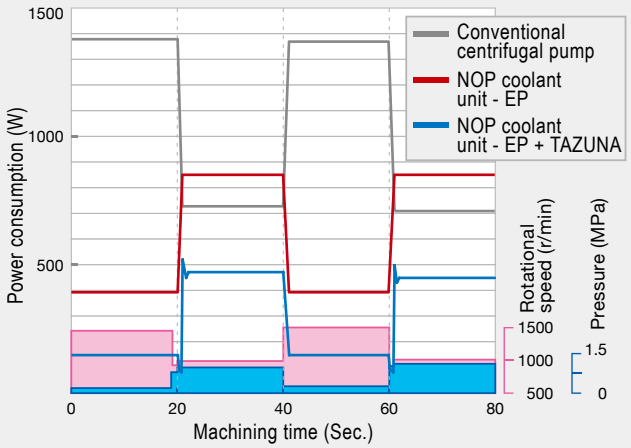

tazuna
TM
A Fluid Control System
It Reduces Annual Electric Cost by Up to 61%
TAZUNA
NOP® COOLANT UNIT + TAZUNA

A Fluid Control System That Reduces Annual Electric Power Cost by Up to 61%

The use of NOP coolant unit cuts the annual electric power cost by about 41%. Additional savings of about 20% would be achieved, or a total of 61%, through the use of the TAZUNA™ fluid control system. Trimming the production costs is a way to improve your competitiveness. The saving impact will be greater in a plant with a multiple of machining center operating. Reduction in power consumption enables trimming of CO^2 and is an effective measure against global warming.

Comparison of Annual Electric Power Bills





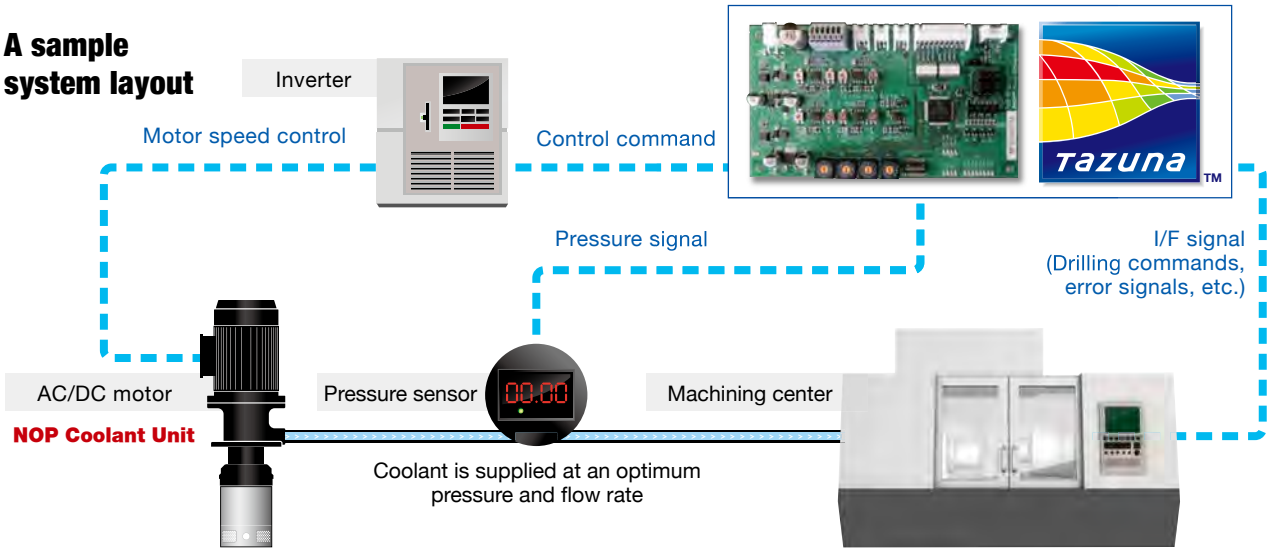
Power Consumption Graph on a Test Operation

- Operating cycle: total 80 seconds cycle
  Unload (0MPa) 20 sec.
  → Through-coolant (1.1 MPa) 20 sec.
  → Unload (0MPa) 20 sec.
  → Through-coolant (1.1 MPa) 20 sec.
- The energy-saving effect will vary due to the difference in machining pressures and drill diameters.
- The calculation is based on operation 8 hours/day, 365 days/year, and the electric power billed at ¥20/kWh.

TAZUNA™ Fluid control System (Software)

TAZUNA™ is an automatic fluid control system (software) developed by NOP. The system uses a pressure sensor to identify the drill diameter being used by the machining center. It continuously controls the NOP coolant unit, adjusting the pressure and flow rate instantaneously according to the drill movement. The absence of unneeded pressure means no extra pressure is wasted through the relief valve. The power consumption is greatly reduced while maintaining machining accuracy.

A sample system layout



Features of TAZUNA™

■ Additional savings in energy

TAZUNA™ adjusts the motor within the NOP coolant unit to an optimum speed for the drill diameter in use, so that significant energy savings and CO^2 reduction can be achieved.

■ Improving machining accuracy

The system is compatible with any drill diameter. Automatic control of the pressure to an optimal value stabilizes the machining accuracy.

■ No initial settings required

As an automatic drill identification system is pre-installed, the system is ready to use. No initial setting and other cumbersome programming (for different drills) are required on the machining end.

■ Warning function

Intelligent System alarms user in advance of upcoming performance deterioration of the pump, so that corrective action can be taken and production-loss can be reduced.

■ Constant pressure control

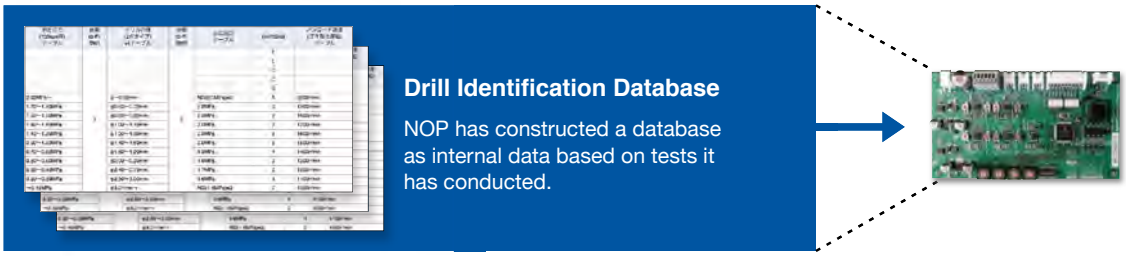
Regardless of drill hole diameters or numbers, coolant is automatically supplied at constant pressure by fixed pressure setting.

■ Compact and low cost

The circuit board is a compact and low-cost single card, complete with required interface.

Automatic Drill Identification System

The system senses the pressure to identify the drill hole diameter. It then selects an optimum machining pressure for the hole diameter by reference to its database. The machining pressure may be fine adjusted to suit different work and cutting fluids. The user's own database may also be stored independently.



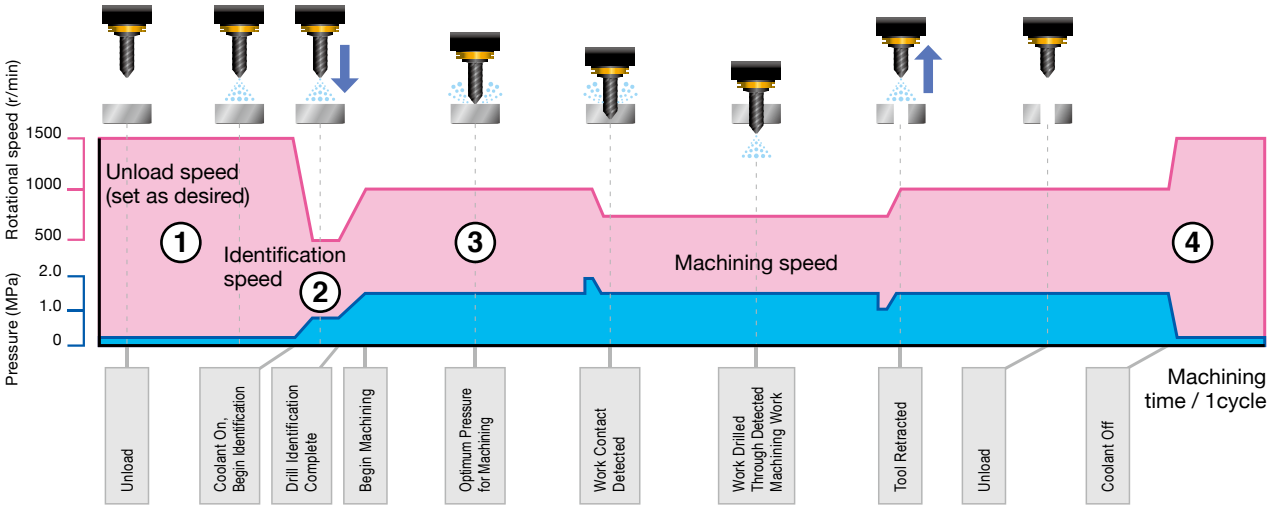
■ A Flowchart for the Automatic Drill Identification System

① In the unload status (While machining is stopped), the system runs at the designated speed in the chip removal mode.

② Following a coolant on input, the speed changes to the drill-identification speed, and identifies the drill hole diameter.

③ The system controls the rotational speed so as to give an optimum machining pressure and flow rate for the drill-hole diameter as identified. (The system continuously controls the rotational speed to give an optimum machining pressure and flow rate during the machining of work.)

④ On completion of the drilling, the system returns to the unload status.



■ A Sample Installation

The system may be customized to suite the user.

Control for a constant pressure and flow rate	The pressure and flow rate are controlled at a constant value regardless of the fluid temperature and deterioration by feeding back the pressure and flow rate signals.
Servo quantitative control	The rotational angle and displacement are sensed for quantitative position control by feeding back the potentiometer signals.
Electro-magnetic proportional control valve	An analog output is linked to an electro-magnetic proportional valve for control of the pressure at an optimum value.

EP

High pressure

- Turbulence™ filter
- Plunger pump: 7.0 MPa, 6.0 MPa, 3.5 MPa, 3.0 MPa
- Compatible with the TAZUNA™ fluid control system (software)

ET·ES

Medium pressure

- Turbulence™ filter
- Trochoid™ pump: 2.0 MPa, 1.5 MPa
- Compatible with the TAZUNA™ fluid control system (software)

Series name	E Series EP (Specification: Turbulence™ filter + Plunger pump)				E Series ET·ES (Specification: Turbulence™ filter + Trochoid™ pump)			
Specifications for pump proper								
Pump model	P008 50 Hz / 60 Hz	P010 50 Hz / 60 Hz	P014 50 Hz / 60 Hz	P016 50 Hz / 60 Hz	T208 50 Hz / 60 Hz	T216 50 Hz / 60 Hz	S208 50 Hz / 60 Hz	S216 50 Hz / 60 Hz
Flow rate (ℓ/min)	12.0 / 14.4	15.0 / 18.0	21.0 / 25.2	24.0 / 28.8	12.0 / 14.4	24.0 / 28.8	12.0 / 14.4	24.0 / 28.8
Compatible fluid	Water-soluble coolant fluid / Straight oil				Water-soluble coolant fluid / Straight oil			
Maximum allowable viscosity (mm^2/s) (Filtration performance)	15 (20 μm), 32 (50 μm)				15 (20 μm), 32 (50 μm)			
Liquid temperature range (°C)	-5～60							
Rotational speed (r/min)	1500 / 1800							
Maximum pressure (MPa)	7.0 / 7.0	7.0 / 6.0	7.0 / 7.0	3.5 / 3.0 (2.2 kW) 7.0 / 6.0 (3.7 kW)	1.5 / 1.5	2.0 / 2.0	1.5 / 1.5	2.0 / 2.0
Total pump head (m)	———							
Filter type	Wire screen filter							
Filtration performance (Nominal value)	20 μm / 50 μm				20 μm / 50 μm			
Contaminant drain port flow rate (ℓ/min)	30～40 (Pressure 0.02 MPa)							
Remarks	Install a plate filter of #18 or finer mesh on the suction end of the tank.							
Painted color of the pump section	Flat black (Approximately Munsell N1.0)							
Approximate weight (kg)	20				16			
Relief valve specifications								
Type	External return type							
Relief pressure setting (MPa)	7.0, 7.0	7.0, 6.0	7.0, 7.0	3.5, 3.0 (2.2 kW) 7.0, 6.0 (3.7 kW)	1.5, 1.5	2.0, 1.5	1.5, 1.5	2.0, 1.5

Motor specifications ※1							
Model No.	2200A3	3700A3	2200A3、3700A3	750A3	1500A3	750A3	1500A3
Specifications	3-phase, squirrel-cage induction motor, totally enclosed, external fan, flange-mounting configuration						
Output (kW)	2.2	3.7	2.2, 3.7	0.75	1.5	0.75	1.5
Voltage (V)	200/200/220/230	200/200/220/230		200/200/220/230	200/200/220/230	200/200/220/230	200/200/220/230
Frequency (Hz)	50/60/60/60	50/60/60/60		50/60/60/60	50/60/60/60	50/60/60/60	50/60/60/60
Rotational speed (r/min)	1460/1755/1765/1770	1460/1755/1765/1765	1460/1755/1765/1770 1460/1755/1765/1765	1440/1730/1745/1745	1445/1740/1750/1755	1440/1730/1745/1745	1445/1740/1750/1755
Rating	S1						
Current (A)	10.6/9.40/9.20/9.20	15.6/14.6/13.8/13.6	10.6/9.40/9.20/9.20 15.6/14.6/13.8/13.6	3.80/3.40/3.40/3.40	6.80/6.40/6.00/6.00	3.80/3.40/3.40/3.40	6.80/6.40/6.00/6.00
Number of phases	3						
Number of poles	4P						
Insulation class	F						
Approximate weight (kg)	33	42	33, 42	18	23	18	23
Protection rating	IP55						
Efficiency class	IE3						
Compliance CE	○						

※1 Please contact us if you need more information about motor specifications.

CT

Medium pressure

- Double-cyclone filter
- Trochoid™ pump: 2.0 MPa, 1.5 MPa
- Compatible with the TAZUNA™ fluid control system (software)

CI

Large flow Lowpressure

- Cyclone filter
- Impeller pump: 406 5 m (Total pump head)

Series name	C Series CT (Specification: Double cyclone filter + Trochoid™ pump)		C Series CI (Specification: Cyclone filter + Impeller pump)			
Specifications for pump proper						
Pump model	T208 50 Hz / 60 Hz	T216 50 Hz / 60 Hz	I155	I152	I305	I302
Flow rate (ℓ/min)	12.0 / 14.4	24.0 / 28.8	150 (Maximum)		300 (Maximum)	
Compatible fluid	Water-soluble coolant fluid		Water-soluble coolant fluid / Straight oil			
Maximum allowable viscosity (mm^2/s) (Filtration performance)	22		22			
Liquid temperature range (°C)	-5～60					
Rotational speed (r/min)	1500 / 1800		3000	3600	3000	3600
Maximum pressure (MPa)	2.0		———			
Total pump head (m)	———		55	40	65	45
Filter type	Cyclone x 2 stages		Cyclone x 1 stage			
Filtration performance (Nominal value)	100 μm：99.9%, 50 μm：95%		Water-soluble coolant fluid 100 μm：99.9% (Silica sand：Specific weight 2.7) Straight oil 100 μm： 80% (Silica sand：Specific weight 2.7)			
Contaminant drain port flow rate (ℓ/min)	30～40 (Pressure 0.02 MPa)		20～35 (Pressure 0.02 MPa)	25～40 (Pressure 0.02 MPa)	45～60 (Pressure 0.02 MPa)	50～70 (Pressure 0.02 MPa)
Remarks	Install a plate filter of #18 or finer mesh on the suction end of the tank.					
Painted color of the pump section	Flat black (Approximately Munsell N1.0)					
Approximate weight (kg)	16		23		34	33
Relief valve specifications						
Type	External return type		———			
Relief pressure setting (MPa)	2.0, 1.5		———			

Motor specifications ※1				
Model No.	750A3	1500A3	1500AC	3700AC
Specifications	3-phase, squirrel-cage induction motor, totally enclosed, external fan, flange-mounting configuration			
Output (kW)	0.75	1.5	1.5	3.7
Voltage (V)	200/200/220/230	200/200/220/230	200/200/220/230	200/200/220/230
Frequency (Hz)	50/60/60/60	50/60/60/60	50/60/60/60	50/60/60/60
Rotational speed (r/min)	1440/1730/1745/1745	1445/1740/1750/1755	2890/3460/3485/3495	2910/3490/3515/3525
Rating	S1			
Current (A)	3.80/3.40/3.40/3.40	6.80/6.40/6.00/6.00	6.00/5.80/5.40/5.20	13.6/13.2/12.2/11.8
Number of phases	3			
Number of poles	4P		2P	
Insulation class	F			
Approximate weight (kg)	18	23	20	36
Protection rating	IP55			
Efficiency class	IE3			
Compliance CE	○			

※1 Please contact us if you need more information about motor specifications.

NOP Coolant Unit User's Instruction Manual (Abstract)

Read precautions thoroughly before use.

INDEX

Be sure to understand the safety counter measures and strictly follow the precautions and operating instructions stated in this manual for safe operation.
When you see the following symbols and titles in this manual, be alert to the potential for personal injury or property damage.
This manual uses the following symbols and titles to identify the risks and danger levels.

Danger: Failure to follow instructions will result in death or serious personal injury.

Warning: Failure to follow instructions can result in death or personal injury.

Caution: Failure to follow instructions can result in personal injury or pump and other equipment damage.

Safety precautions

•Safety devices

- Equip motor with an “Earth-Leakage Circuit Breaker (ELCB)” or overload protection equipment without fail.
- Check the motor name plate for the ratings, and set up and operate the motor within the specified ratings.
- Follow all the technical standards applicable to electrical facilities.

Caution: Failure to use “Earth-Leakage Circuit Breakers(ELCB)” and overload protection equipment could result in damage to the equipment or motor burnout.

- To avoid pump damage, install a flow monitor, pressure sensor, or such other devices in the pump’s outlet line to detect dry running.
- The oil seals and packings cannot be used indefinitely.
- Install the pump in a safe location, or provide an protective cover or device to prevent personal injury or equipment damage caused by an accidental oil leaks.

•Safety measures

- Keep children or other people incapable of judging risks away from the pumps.
- Protective equipment should be installed to prevent fingers, hands or other objects from getting caught in the rotating or moving parts.

Warning: Getting your fingers, hands or articles caught in the rotating or moving parts may cause unexpected injury.

- Do not touch the pump or motor during or immediately after the operations.

Warning: Heat will build up in the motor and pump while in operation. Contact with motor by hand may cause burns.

Danger : Do not operate the pump in a place having a risk of explosion or a place with highly concentrated dust. Do not place a flammable liquid or article around the motor. It may cause an explosion or fire.

Pump installation

•Place of installation

Caution: NOP coolant unit is limited to indoor use only.

Caution: Make sure to use the predefined parts of suspension fittings whenever you lift up the pump. Check the position of suspension fittings from the drawing.

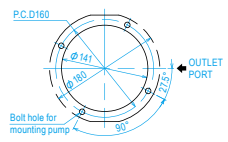
Caution: Mounting pump in a wrong orientation will damage the motor. Install the pump unit in an upright position.

Caution: Mounting on an unlevel surface or forcible installation in which the installation holes are not in exact alignment may damage the pump.

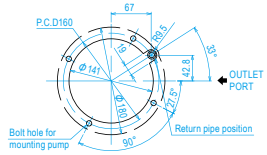
Caution: Do not install EP, ET, ES or CT in locations where pump may suck tramp oil on the liquid surface or foam is generated. Installation in such locations may cause cavitation which damages the pump.

Figure 1: Pump mouting hole patterns

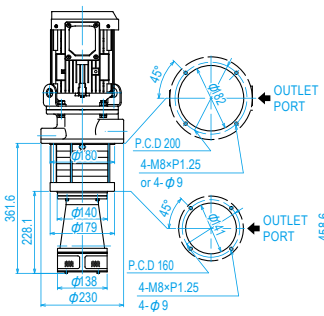
E Series EP



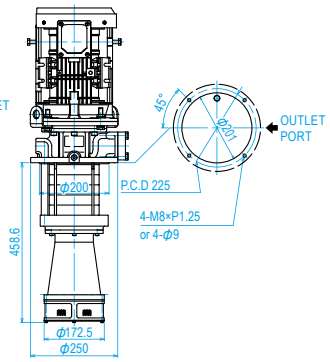
E Series ET·ES, C Series CT



C Series CI (150 L Type)



C Series CI (300 L Type)



•Space required for installation.

Do not operate NOP coolant unit in a dusty, extremely high, or low temperatures environment (See page P.44 for the ambient temperatures.). It is recommended to provide minimum clearances as illustrated by figure 3 for easy maintenance.

Dimensions	
C1	≧ D+30 mm
C2	≧ 200 mm
C3	≧ 50 mm
D	Pump height below the top of tank

•Recommended layout for EP, ET, ES.

- For safe and efficient operation of NOP coolant unit, The recommended pump piping layout are as illustrated below, in particular, piping for air-bleeding in the pump’s outlet line.

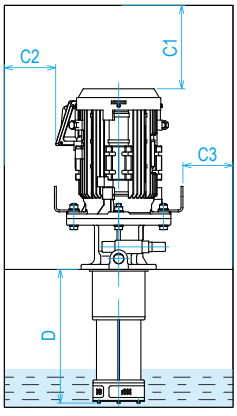


Figure 2: Required clearances around the pump
(*For illustration purposes only.)

Figure 3: Recommended air bleeding circuit (Typical)

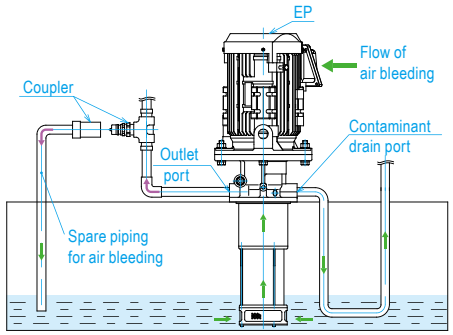
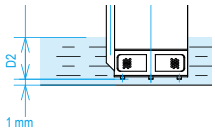


Figure 4: Gap under the bottom of pump (Typical)

Dimensions	
EP, ET, ES	≧ 60 mm
CI 150 ℓ	≧ 77 mm
CI 300 ℓ	≧ 80.5 mm



Position of pump inlet port

Pump is to be mounted in the tank maintained more than 1 mm from the tank bottom.
If sediments of sludge, swarf or other material larger than 3mm may accumulate at the tank bottom, provide a sufficient clearance to ensure that the pump doesn't suck the sediments directly.
The pump must be installed in a position higher than instructed in Figure 4. If installed lower than Figure 4, air may be drawn up into the system, resulting in abnormal noise, impairing turbulence filter performance and pressure drop, and the pump will be damaged.

•Rc 3/8 drain piping (This section only applies to CI)

If mounting the pump on the middle flange (ϕ140 PCD), drain piping (Rc 3/8) must be installed to ensure that the drain liquid will return to the tank.

•Filters

⚠ **Caution:** A pre-filtration device such as a plate (screen-type) filter must be inserted to ensure that the large objects do not clog the pump inlet.The recommended filter mesh size is 18 (about 1mm sieve size).

All foreign objects larger than the perforations of the inlet port must be pre-filtered.
If higher filtration accuracy is required than shown in Table 1, install in-line filter in the outlet line.

•Performance of built-in filter

Table 1 : Filtration performance
E Series EP, ET/ES

Inlet port	3 mm (Solids larger than 3 mm must be removed from the tank.)
Filter (Nominal value)	20 µm 50 µm (Selected at time of purchase) *50 µm filter is the only option for using straight oil.

C Series CT

Inlet strainer	3 mm (Solids larger than 3 mm must be removed from the tank.)
Cyclone filter	50 µm : 95% (Specific weight 2.7) 100 µm 99% (Specific weight 2.7)

C Series CI

Inlet port	3 mm (Solids larger than 3 mm must be removed from the tank.)	
Cyclone filter	Water soluble coolant 100 µm	99.9% (Specific weight 2.7)
	Straight oil 100 µm	80% (Specific weight 2.7)

⚠ **Caution:** Suction of excessive amount of needle-like or wool-like swarf, which is even smaller than 3 mm, may cause clogging of inlet port, turbulence filter (E series), cyclone filter (C series) or impellers.

⚠ **Caution:** If in-line filter is to be installed in the outlet line, it must be cleaned regularly. Continuous use of clogged filters may result in abnormal noise, vibration, inadequate discharge, and damage to the pump.

⚠ **Caution:**

Suction of tramp oil or foam in the liquid will impair turbulence filter or cyclone filter performance. If you use E series, it is particularly advisable to insert a partition, for example, as shown in figure 5 to ensure that the pump does not suck tramp oil or foam.

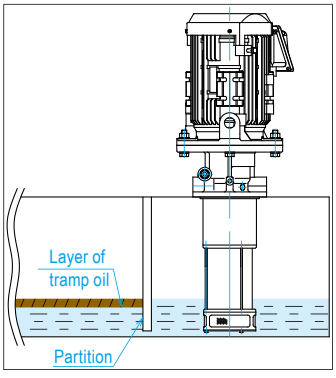


Figure 5 : Reference method for preventing suction of tramp oil (*For illustration purposes only)

Contaminant drain port

- The coolant will be seperated into thickened dirty coolant and filtered clean coolant through either turbulence filter (E seiries) or cyclone filter(C series) inside the pump, and the thickeded dirty coolant will be discharged from the contaminant drain port.
- It is highly advisable to use wire mesh bucket or other filration devices to collect swarf discharged from contaminant drain port rather than just release it back to the tank. It will help keep your tank clean.

⚠ **Caution:** The diameter of piping in the contaminant drain line must be equal size or larger than the port diameter. The contaminant drain line must be no higher than 1 meter from the tank bottom vertically, and no longer than 3 meters horizontally. It should be as short and straight as possible with minumum number of bends (PVC hose is recommended for piping). Failure to follow and apply will result in discharge failure and may lead to pipe clogging or pump damage.

⚠ **Caution:** Do not restrict flow to as little as 20 L/ min or less. Excessive flow restriction will decrease the performance of turbulence filter or cyclone filter and may damage the pump.

⚠ **Caution:** Do not release the liquid of contaminant drain line to a location where it may affect pump suction (such as a suction of foam). It may cause an abnormal noise, a pump damage, a decline in pressure and flow.

⚠ **Caution:** E series and C series CT can make a louder noise at the first run, and the noise continues until the trapped air in the contaminant drain port is fully released. It is a normal operation sound, and will disappear as air goes out.

⚠ **Caution:** If the liquid of contaminant drain line is released in the open atmosphere, air may be drawn into the pump and trapped inside immediately after the operation stops. If using E series or C series CT, the trapped air often causes a delay in coolant discharge and produce noise when the operation resumes. So take measures to prevent suction of air, such as submerging a part of the contaminant drain line below the liquid surface level. (See a sample system layout of each model for your reference.)

⚠ **Caution:** If a valve is to be inserted in the contaminant drain line, choose a gate type. A ball type will reduce the port diameter and may result in contaminant discharge failure and damage the pump.

⚠ **Caution:** Restriction or blockage in the contaminant drain line may lead to an accumulation of swarf, which may decrease cyclone filter or turbulence filter's performance and pump or machine may be damaged.

Table 2: Contaminant drain port performance (for reference only)
See the contaminant drain port performance of each model from the table below

Model		Flow rate	Discharge pressure
E series EP, ET,ES		20-40 L/min	0.02 MPa
C Series CT			
C Series CI	I155	20-35 L/min	
	I152	25-40 L/min	
	I305	45-60 L/min	
	I302	50-70 L/min	

Outlet port

- The diameter of a pipe connected to outlet port must be a pressure resistant type and as large as the port diameter.
- Install a check valve (NRV) in the outlet line near the outlet port to reduce the time lag from motor startup to liquid discharge and to prevent rust inside the pump.
- Pump and pipes must be filled with liquid at all times.

Piping for the pump

•Torque applied on pipe connection

(The maximum torques permissible for pipe connections to NOP coolant unit are shown in the table that follows:)

Table 3: Maximum permissible torque by pipe size
E series EP, ET,ES C series CT

Pipe size (Rc)	1/2	3/4
Torque (N.m)	25	30

C series CI

Pipe size (Rc)	1-1/2	1/2	3/4
Torque (N.m)	150	60	30

⚠ **Caution:** Tightening pipes above the specified torque value (listed in Table 3) may cause damage to the port.

⚠ **Caution:** Excessive use of thread-sealant tape on pipe thread or use of a liquid type sealant will reduce the friction resistance and may result in over-torque and the port damage.

•Connecting the pipes

- To prevent leaks and air entry, make sure all pipe connections are

securely and completely airtight.
- Be sure to use pipe supports so that the pipes are self-supported and will not place any weight on the pump.
- During pipe-working, make sure that the pipe lengths and angles are correct so that no unnecessary strain is placed on the pump.
- Installation of a pressure gauge in the outlet line is recommended to monitor the pump operation.
- Installation of a stop valve, union joints, and such other fittings are also recommended for easy maintenance.
- Some high-pressure hoses may have a smaller inside diameter. Check the hoses not only for outside diameter but also for inside diameter as well before use.
- It is recommended to install an air vent valve in the outlet line to prevent potential startup troubles.

•Pipes and pipe joints

- All pipes must be cleaned thoroughly before connected to the pump. Some pipes may have dust from storage or threading chips remaining inside. Be sure to flush out all pipes to ensure that they are thoroughly clean before use.

⚠ **Caution:** Incomplete flushing may result in the pump and connecting equipment failure.

⚠ **Caution:** Do not attempt to flush out the pipes after connecting to the pump.

⚠ **Caution:** Test the pipes for air tightness before installing the pump.

⚠ **Caution:** Inspect all valves, cocks, joints and the like before installation. Avoid using any component that has a small port or a cavity in the casting. Failure to follow and apply will result in contaminant discharge failure and may cause pipe clogging or pump damage.

Electric wiring

- Electric wiring must be carried out by qualified personnel.

⚠ **Warning:** Ensure the power is disconnected prior to do any wiring work. Also take measures to avoid accidental power-on.

⚠ **Warning:** Connect the motor in accordance with the motor wiring diagram or the User's Instruction Manual to prevent fire and electrical shock.

⚠ **Warning:** Ground the equipment properly to prevent fire and electrical shocks from electrical leakage.

- Check the direction of the factory-installed motor rotation indicated on the nameplate which is attached to the motor frame or terminal box and connect the motor accordingly.
  [The factory-installed special motor (a 3-phase type) is designed to rotate counter-clockwise when viewed from the suction side (bottom), if wired as illustrated in the table below.]

Figure 6 : Motor wiring diagram (*For illustration purposes only)

For operation

•Start-up checklist

- Is the tank filled with liquid up to, or over the specified level? (See Fig.4)
- Are the inlet, outlet and drain ports unblocked?
- Check for loose pipe connections.
- On the initial startup, turn the pump on and off quickly to ensure that the motor is running in the correct direction.

⚠ **Caution:** Do not reverse the pump rotation. Continuous reverse rotation may damage oil seals and the liquid may be ejected, resulting in an serious accident.

•Cautions for trial run

⚠ **Caution:** Never run the pump dry for 10 seconds or longer. If the pump fails to prime, stop the motor.

⚠ **Caution:** If pump is not discharging on initial run, perform air bleeding in the outlet line

⚠ **Caution:** Be sure to perform air bleeding if a check valve of which the pressure resistance is above 0.05 MPa is installed in the outlet line. No coolant may be discharged till the trapped air is fully released.

Inspections

•Daily startup inspections

- Check for liquid leakage, abnormal sound, and heating.

⚠ **Caution:** If an abnormal phenomenon is discovered, stop the pump immediately and check for the defective areas.
(See P.45 Trouble shooting guide)

•Periodical inspections

- Periodical inspection must be performed at least once a year.

<Periodical inspection checklist>

- Outlet flow rate, pressure
- Flow rate of contaminant drain port (Guideline ≦ 20 L/min)
- Clogging of contaminant drain port
- Clogging of the inlet port (Perforated metal)
- Leaks from pipe connected areas
- Liquid level inside the tank (High enough to prevent drawing air into the system)
- Amount of swarf inside the tank (It is recommended to clean the tank once in a half year)
- Concentration level of the liquid (Within the range that the manufacturer recommends)
- Kinematic viscosity of coolat liquid (See P.39, 40 Specification tables for all series)
- Liquid temperature (-5°C~60°C)
- Over-heating of pump motor

Storage

- It is recommended to keep spare parts in storage (pumps, motors and coupling) to deal with possible pump down or performance drop due to the pump aging.
- Be sure to schedule and perform a periodical inspection.
  (See "《Periodical inspection》")
- If a pump is to be stored for an extended period of time, protect the pump against the internal rust by pumping lubricating oil of 15 mm^2/s or less viscosity for three minutes to wet inside the pump. Put lids on the ports, wrap the unit in a vinyl bag, sealed it air tight and store. If storing for six months or longer, check for exterior rust and free rotation once a month.
- If a pump has to be restarted after the long-term storage check it out for unusual noise, heating, and other abnormalities on its first run. Stop operation immediately when any of these mentioned above occurs.

⚠ **Danger:** Ensure the power is disconnected prior to performing maintenance work or inspections. Also take measure to prevent accidental power-on.

Warranty

- NOP coolant unit is warranted to be free from defects in workmanship and materials for one year after the delivery to customer's designated location, or 5000 hours of operation, whichever occurs first.
- The warranty does not cover troubles resulting from operation beyond the specifications or other external causes.
- The product warranty is applicable only to operation within the product specifications and in accordance with this User's Instruction Manual.
- The warranty does not cover, and consequently we will not be responsible for, any disassembly, alteration made to a product by the customer.
- The warranty will not cover pump troubles arising out of any causes which are not the responsibilities of, or are not attributable to Nippon Oil Pump Co., Ltd., including disasters and the troubles caused by other than the subject pump.
- The warranty covers the particular product as delivered. We are not responsible in anyway whatsoever for secondary loss arising out of a problem with a product that we have delivered.

For selecting a pump

•Operating method

- E series is most suitable for intermittent operation. Please check operating method. Continuous operation is also permitted.
- C series must be limited to continuous operation. Minimize the number of ON/OFF cycles if intermittent operation is unavoidable. (Intermittent operation on CT is strictly forbidden)

•Required flow rate

- Check your requirements in accordance with the catalogs, drawings, or other materials.
- The discharge rate is subject to the type, temperature, and pressure of the liquid.
- Selecting with an adequate margin of outlet pressure and flow rate is recommended.

•Required pressure

- Check your requirements in accordance with the catalogs, drawings and other materials.

Note : The pump must be run within the maximum pump operating pressure and the motor output rating.

•Relief valve pressure setting (Not applicable to CI)

- The relief valve is to be set at the cracking pressure as a factory default.

Notes : The relief valve setting must be within the maximum pump operating pressure and the motor output rating.
The cracking pressure is the set pressure at which the pressure building up inside the circuit starts to open the valve and allow certain amount of oil to flow.

⚠ **Caution:** If pump runs over the maximum pressure while in operation, lower the relief pressure setting or provide by-passing circuit to avoid over-pressurization. Running pump over the maximum pressure may cause motor burnout or damage to the pump.

Caution: If you use E series or C series CT, make sure that the end of return pipe is dipped under the surface of liquid at all times. Releasing it above the liquid surface may cause foam and abnormal sounds

Caution: Do not run E series or C series CT with the relief valve fully opened, provide by-passing circuit to release pressure if necessrary.

Caution: C series CI can not run against a closed outlet. It will result in pump or motor damage.

•Select a pumped liquid.

Use of liquid which doesn't offer lubricity, rust protection (such as tap water) or contains corrosive substances (such as a cutting fluid that contains active sulfur) will damage the pump.
Using liquids beyond the specified viscosity range may cause filter clogging or motor overload which can result in pump damage, motor burnout, performance decrease, liquid leaks.
Follow the specified viscosity range and coolant types as follows:

<E series ET, ES>
- Water-soluble coolant or straight oil of 32 mm^2/s or less viscosity. (20 µm element is compatible with liquid of 15 mm^2/s or less viscosity, 50 µm element is compatible with liquid of 32 mm^2/s or less viscosity)

<E series EP>
- Water-soluble coolant of 15 mm^2/s or less viscosity.
  *Please consult us if you use straight oils on EP.

<C series CT>
- Water-soluble coolant of 22 mm^2/s or less viscosity

<C series CI>
- Water-soluble coolant or straight oil of 22 mm^2/s or less viscosity

Caution: Use of liquid with higher viscosity on CI will not just cause a performance decrease in cyclone filter, but also increase motor output.

Note : Low winter temperatures must be taken into account as the viscosity will increase with temperature.

Caution: The seals of NOP coolant unit are made of fluoro carbon rubber. Check in advance with the liquid manufacturer (or distributor) for the compatibility with the material of seals. Use of incompatible liquid will cause liquid leakage.

Warning: The pump cannot be used for volatile liquids like gasoline, nor fuel oils like kerosene. They may explode or cause fire.

•Operating ambient temperatures

- The permissible ambient temperature range is between -10°C and 40°C.

Caution: Operation over the range specified in the foregoing may cause motor burnout, pump damage and severe accident. It can also significantly shorten the pump service life and cause a performance loss or liquid leakage.

•Temperature range of the pumped liquid

- The permissible temperature range for the liquid is between -5°C and 60°C.
- When start-up, keep the temperature gap between the liquid and ambient temperature within 40°C.

Warning: Pumping high temperature liquid may result in personal burns from a damaged pump or leaked liquid.

Caution: Running the pump beyond the specified range temperature may cause decrease in performance or liquid leaks which can result in shortening the pump service life significantly.

•Compatible work materials

Caution: Machining hard work materials, such as Inconel, Titan, Tungsten, may shorten the pump service life significantly, and result in pump performance decrease or liquid leakage. ET, EP and CT is compatible with work materials of up to HV 300 and ES and CI is up to HV 600.

Caution: Machining work materials containing Si of over 6%, such as Aluminum Die Cast (ADC), Ductile on EP,ET or CT, may shorten the pump service life significantly, and result in pump performance decrease or liquid leakage.

Caution: Machining work materials, such as special hardened steel, carbon fiber, glass fiber containing materials, carbon materials, may shorten the pump service life significantly, and result in pump performance decrease or liquid leakage.

Caution: Running EP,ET,ES and CT in the tank liquid which contains a large amount of grind stones or abrasive grains may shorten the pump service life significantly, and result in pump performance decrease or liquid leakage.

Caution: Machining work materials, such as coating film, resin may not just cause a significant loss in performance of turbulence filter, cyclone filter or impeller but also clog the element.

•Tool hole diameters

Caution: Using a tool with an oil hole smaller than 0.3 mm or less diameter may cause clogging with swarf.

For selecting a motor

•Required power for the pump

- Select a motor with adequate power margin with reference to the performance carve of the pump on the catalog.
- The power required by the pump will vary depending on pressure, flow rate and viscosity of the oil.
- More power is required if the viscosity of the liquid increases.

Note : Low winter temperatures must be taken into account when selecting a motor as the viscosity will increase with temperature.

•Power supply voltage and frequency.

Caution: Applying incorrect supply voltage or frequency may lead to motor burnout, abnormal pressure or abnormal flow.

Caution: Connect the pump with appropriate power supply frequency according to the specification of each model. Connection with wrong frequency may lead to motor burnout, abnormal pressure or abnormal flow

Caution: Operation at a slow speed or a high speed may cause pump malfunction.

Suction performance

NOP coolant unit is a self-priming pump, however the performance will be reduced by the resistance in the inlet area or suction of air. Pay attention to the tank liquid surface level and clogging of the inlet port (perforated metals).

Caution: The excess resistance in the outlet line will impair the suction performance.

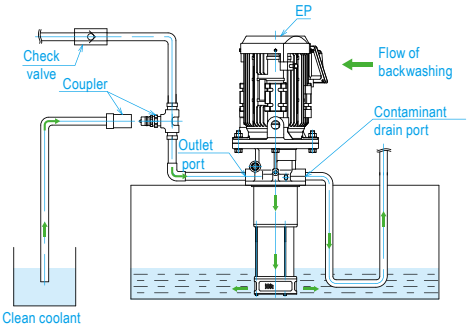
Caution: Entry of air from the inlet port will cause cavitation inside the pump, which damages the pump or decreases turbulence filter performance and the element may get clogged as a result. (If using CI, it will decrease suction performance.)

Caution: Inlet port cleaning must be performed on a regular basis, continuous use of clogged inlet will cause abnormal noise, vibration, discharge failure, which result in the pump damage

Backwashing (See P.45 "troubleshooting guide")

If the pump discharge or intake rate of E series (element type) is reduced, the turbulence filter is possibly clogged. In that case, clogged filter can be cleaned by backwashing and filter performance will be restored. Follow the procedure shown below for backwashing.

① Set up a washing tank and pour in some (guideline: 10 L) clean coolant.
② Turn the coupler toward the direction of washing tank.
③ Change connections between terminal U and V, and run the pump in reverse and let the pump suck the clean coolant from the washing tank for 5 seconds to backwash (This process can be repeated several times)
④ After backwashing is completed, return the coupler toward the direction of machine tool.
⑤ Restore the original terminal connections and run the pump in the normal rotation.



Caution: Backwashing will not recover filtration performance of a pump completely. Constant filter clogging suggests the possibility of operating the pump beyond the specifications. In particular, be careful not to allow tramp oil and foam to be mixed in the coolant tank.

If you experience no oil discharge, a high pitched sound, or such other abnormal phenomena soon after the installation, check the troubleshooting guide on the next page.
If you cannot find out the cause of trouble, consult us or a dealer.

See next page for Troubleshooting guide

■ Troubleshooting guide

Symptom	Possible causes	Check methods	Possible remedies
No discharge from outlet port. Insufficient flow or pressure. Abnormal noise.	Motor failure	Are wires at motor loose or disconnected? Do operation test for motor individually.	Repair or replace motor.
	Motor is wired incorrectly or disconnected.	Are wires at motor loose or disconnected? Check direction of rotation.	·Rewire motor in a correct rotation indicated on label.
	Coupling is damaged.	Check connected area between pump and motor.	Replace coupling.
	Insufficient liquid level	Check liquid level in the tank	·Add enough liquid ·Control liquid level with level sensor.
	Inlet port is clogged.	Check the inlet port for clogging.	·Periodical cleaning on and around inlet port. ·Insert a plate filter prior to the inlet port as a pre-filtration."
	Turbulence filter is clogged. It only applies to E series	·Does pump deliver liquid from contaminant drain port?" ·Is there abnormal noise? ·Is there tramp oil?	·Perform backwashing. (See P.44 "**Backwashing**".) ·Take measures to prevent suction of air or tramp oil."
	Impeller is clogged with swarf, pump failure	Check for impeller clogging and damage	·Remove swarf ·Repair or replace pump
	Air drawn into pump or pipes.	After long term storage or immediately after replacing coolant liquid, pump often doesn't discharge due to air inside the pump.	·Perform air-bleeding on pump or piping. ·Perform air-bleeding in front of check valve if the one is installed in outlet line.
	Pump failure or wear	·Does motor rotate? ·Are viscosity and lubricity adequate? ·Is there abnormal noise?	Repair or replace motor. Change the types of coolant you use.
	Cavitation, Aeration.	Is pump sucking foam or air?	·Take measures to prevent suction of air or tramp oil. (ex. Change pump location, use partition or anti-foaming agent)
	Pipes connected to outlet port is too large.	Is inlet discharge flow rate sufficient?	·Use smaller pipes.
	Relief valve pressure setting.	Does pressure build up when tightening the relief valve's pressure control screw?	Tighten up the relief valve's pressure control screw to the required level.
	Relief valve fixing.	Does pressure not build up when tightening the relief valve's pressure control screw?	·Repair or replace relief valve. ·Remove tramp oil.
No discharge from contaminant drain port	Contaminant drain port piping is too long or too high.	Take off a pipe from the contaminant drain port and check if liquid is properly being delivered or not	Piping must be no higher than 1m from the tank bottom vertically, and no longer than 3m horizontally.
	Clogging of contaminant drain port.	Check the clogged area in the pipe line.	·Clean inside the pipe periodically. ·Minimize the number of bends in piping ·Use larger pipe.
	Clogging or failure of suction impeller	Check the suction impeller for clogging or damage.	·Remove accumulated swarf. ·Repair or replace pump.
Liquid leaks.	Oil seal deterioration or damage.	Does liquid leak from near the coupling connected area?	Repair or replace pump.
	Packing deterioration or damage.	Does liquid leak from connected area?	Repair or replace pump.
Breaker or thermal trips out.	·Motor failure. ·Wiring errors.	·Check motor wiring. ·Does motor start?	·Rewire motor. ·Repair or replace motor
	Overloading.	Are motor output rating and liquid viscosity adequate?	·Use motor with higher output rating. ·Use pump with lower capacity. ·Lower the pressure setting. ·Change the coolant types.
	Coolant type is incompatible. (Viscosity is too high or insufficient lubricity.) Pump failure	·Is motor rotating? ·Are liquid viscosity and lubricity adequate? ·Is there abnormal noise?	·Repair or replace pump. ·Change the types of coolant you use.

NOP Coolant Unit Material Compatibility Tables

※Compatibility of material may vary depending on individual tank conditions, such as tank maintenance status, shapes of work materials
The information below is for reference only. Please consult us for further details.

✓=Compatible ×=Incompatible △=Conditionally compatible

Material		Number (Typical)	Hardness (HV)	EP	ES	ET	CT	CI
Metal	Carbon steel	S45C	120～269	✓	✓	✓	✓	✓
	Chromium steel	SCr435	255～321	✓	✓	✓	✓	✓
	Chromium molybdenum steel	SCM445	302～415	✓	✓	✓	✓	✓
	Nickel-chromium steel	SNC815	302～415	×	✓	×	×	✓
	Carbon tool steel	SK95 (SK4)	203～286	✓	✓	×	×	✓
	High speed tool steel	SKH56	722	×	✓	×	×	✓
	Alloy tool steel	SKT6	512～580	×	✓	×	×	✓
	High carbon chromium bearing steel	SUJ5	222～512	✓	✓	✓	✓	✓
	Spring steel	SUP10	363～429	×	✓	×	×	✓
	Aluminum alloy	2000,7000series	45～130	✓	✓	✓	✓	✓
	Aluminium alloy for die-casting	ADC14	120	×	✓	×	×	✓
	Brass	C2801P	80～150	✓	✓	✓	✓	✓
	Chromium copper	SCr435	255～321	✓	✓	✓	✓	✓
	Gray cast iron	FC250	160～285	✓	✓	✓	✓	✓
	Ductile cast iron	FCD800	160～300	✓	✓	✓	✓	✓
	Austenitic stainless steel	SUS304	≧ 200	✓	✓	✓	✓	✓
	ferritic stainless steel	SUS430	183	✓	✓	✓	✓	✓
	Martensitic stainless steel	SUS440C	≧ 615	×	✓	×	×	✓
	Titanium alloy steel	TP340	110～320	×	✓	×	×	✓
	Inconel	Alloy 625	400～859	×	✓	×	×	✓
	Tungsten steel		100～350	×	✓	×	×	✓
	Heat-resistant alloy (For aero-engine)	M152	300	×	✓	×	×	✓
Non-Metal	Ceramic		2350	×	×	×	×	△
	Abrasive grain			×	×	×	×	✓
	carbon			×	×	×	×	×
	Resin			×	×	×	×	×

Scan the QR code for more technical data

NOP® COOLANT UNIT

HP: search NOP COOLANT UNIT http://coolant-unit.nopgroup.com/en/

Safety notice: For safe operation of our products, please peruse the User's Instruction Manual provided with the product.

NOP® Nippon Oil Pump Co., Ltd.

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For further information:

Search NOP PUMP

HP: http://www.nopgroup.com/english

Tel : +81-3-6402-4041
Fax: +81-3-3436-1777

Sumitomo Fudosan Higashi Shimbashi Building-6 3F,
1-2-4 Hamamatsucho, Minato-ku, Tokyo, Japan
105-0013

Your dealer:

20180810-W