

# ABBREVIATIONS AND SYMBOLS FOR HVAC&R DRAWINGS

C			IRANIAN PETROLEUM STANDARDS				
B			NO REVISION PERMITTED UNLESS APPROVED BY STANDARD ORGANIZATION				
A			ABBREVIATIONS & SYMBOLS FOR HVAC&R DRAWINGS	DATE	DRAWING No.	SHT	REV.
REV	DESCRIPTION	DATE			IPS - D - AR - 010	1	12

# GRAPHICAL SYMBOLS FOR HVAC&R DRAWINGS

THE FOLLOWING GRAPHICAL SYMBOLS ARE EXTRACTED FROM ASHRAE'S. FUNDAMENTAL GUIDEBOOK 1993, SOME OF THESE SYMBOLS HAVE BEEN MODIFIED AND OTHERS HAVE BEEN ADDED TO REFLECT IPS. REQUIREMENTS

## LIST OF GRAPHICAL SYMBOLS AND ABBREVIATIONS

### A) PIPING

#### 1) HEATING



HIGH PRESSURE STEAM	—————	HPS	—————
MEDIUM PRESSURE STEAM	—————	MPS	—————
LOW PRESSURE STEAM	—————	LPS	—————
HIGH PRESSURE CONDENSATE	—————	HPC	—————
MEDIUM PRESSURE CONDENSATE	—————	MPC	—————
LOW PRESSURE CONDENSATE	—————	LPC	—————
BOILER BLOW DOWN	—————	BBD	—————
PUMPED CONDENSATE	—————	PC	—————
VACUUM PUMP DISCHARGE	—————	VPD	—————
MAKEUP WATER	—————	MU	—————
ATMOSPHERIC VENT	—————	ATV	—————
FUEL OIL DISCHARGE	—————	FOD	—————
FUEL OIL GAUGE	—————	FOG	—————
FUEL OIL SUCTION	—————	FOS	—————
FUEL OIL RETURN	—————	FOR	—————
FUEL OIL TANK VENT	—————	FOV	—————
LOW TEMPERATURE HOT WATER SUPPLY	—————	HWS	—————
MEDIUM TEMPERATURE HOT WATER SUPPLY	—————	MTWS	—————
HIGH TEMPERATURE HOT WATER SUPPLY	—————	HTWS	—————
LOW TEMPERATURE HOT WATER RETURN	—————	HWR	—————
MEDIUM TEMPERATURE HOT WATER RETURN	—————	MTWR	—————
HIGH TEMPERATURE HOT WATER RETURN	—————	HTWR	—————
EXISTING PIPING	—————	(NAME) E	—————
PIPE TO BE REMOVED	— * — * —	(NAME)	— * — * —

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A			<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%; border-bottom: none;">ABBREVIATIONS &amp; SYMBOLS FOR HVAC&amp;R DRAWINGS</td> <td style="width: 10%; border-bottom: none;">DATE</td> <td style="width: 20%; border-bottom: none;">DRAWING No.</td> <td style="width: 10%; border-bottom: none;">SHT/REV.</td> </tr> <tr> <td style="border-top: none;">REV</td> <td style="border-top: none;">DESCRIPTION</td> <td style="border-top: none;">DATE</td> <td style="border-top: none;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;"></td> <td style="width: 10%;"></td> <td style="width: 20%; text-align: center;">IPS - D - AR - 010</td> <td style="width: 10%; text-align: center;">2 / 12</td> </tr> </table> </td> </tr> </table>	ABBREVIATIONS & SYMBOLS FOR HVAC&R DRAWINGS	DATE	DRAWING No.	SHT/REV.	REV	DESCRIPTION	DATE	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;"></td> <td style="width: 10%;"></td> <td style="width: 20%; text-align: center;">IPS - D - AR - 010</td> <td style="width: 10%; text-align: center;">2 / 12</td> </tr> </table>			IPS - D - AR - 010	2 / 12
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## 2)AIR CONDITIONING AND REFRIGERATION

REFRIGERANT DISCHARGE	_____ RD _____
REFRIGERANT SUCTION	_____ RS _____
BRINE SUPPLY	_____ B _____
BRINE RETURN	_____ BR _____
CONDENSER WATER SUPPLY	_____ C _____
CONDENSER WATER RETURN	_____ CR _____
CHILLED WATER SUPPLY	_____ CWS _____
CHILED WATER RETURN	_____ CWR _____
FILL LINE	_____ FILL _____
HUMIDIFICATION LINE	_____ H _____
DRAIN	_____ D _____
HOT/CHILLED WATER SUPPLY	_____ HCS _____
HOT/CHILLED WATER RETURN	_____ HCR _____
REFRIGERANT LIQUID	_____ RL _____
HEAT PUMP WATER SUPPLY	_____ HPWS _____
HEAT PUMP WATER RETURN	_____ HPWR _____

## 3)PLUMBING

SANITARY DRAIN ABOVE FLOOR OR GRADE	_____ SAN _____
SANITARY DRAIN BELOW FLOOR OR GRADE	----- SAN -----
STORM DRAIN ABOVE FLOOR OR GRADE	_____ ST _____
STORM DRAIN BELOW FLOOR OR GRADE	----- ST -----
CONDENSATE DRAIN ABOVE FLOOR OR GRADE	_____ CD _____
CONDENSATE DRAIN BELOW FLOOR OR GRADE	----- CD -----
VENT	----- V -----
COLD WATER	_____ _____
HOT WATER	_____ _____
HOT WATER RETURN	_____ _____
GAS	_____ G _____ G _____
ACID WASTE	_____ ACID _____
DRINKING WATER SUPPLY	_____ DWS _____
DRINKING WATER RETURN	_____ DWR _____
VACUUM (AIR)	_____ VAC _____
COMPRESSED AIR	_____ A _____
CHEMICAL SUPPLY PIPES	_____ (NAME) _____
FLOOR DRAIN	_____  D _____
FUNNEL DRAIN, OPEN	_____  _____

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## B) FIRE SAFETY DEVICES <sup>a</sup>

### SIGNAL INITIATING DETECTORS

HEAT (THERMAL)



GAS



SMOKE



FLAME

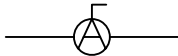


<sup>a</sup> FOR ADDITIONAL SYMBOLS, REFERENCE IS MADE TO NFPA STANDARD 172 P-86 (FIRE PROTECTION SYMBOLS FOR ARCHITECTURAL AND ENG. DRAWINGS).

## C) VALVES

### 1) VALVES FOR SELECTIVE ACTUATORS

AIR LINE



OUTSIDE SCREW & YOKE (OS&Y)



BALL



LEVER



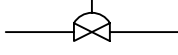
BUTTERFLY



GEAR



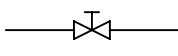
DIAPHRAGM



b) ELECTRIC MOTOR



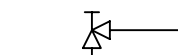
GATE



SOLENOID



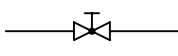
GATE, ANGLE



c) PNEUMATIC MOTOR



GLOBE



DIAPHRAGM

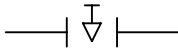


GLOBE, ANGLE

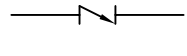


### 3) VALVES, SPECIAL DUTY

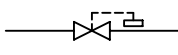
PLUG VALVE



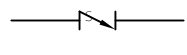
CHECK, SWING GATE



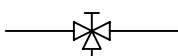
FLOAT VALVE



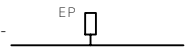
CHECK, SPRING



THREE WAY



CONTROL, ELECTRIC - PNEUMATIC

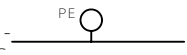



### 2) VALVE ACTUATORS

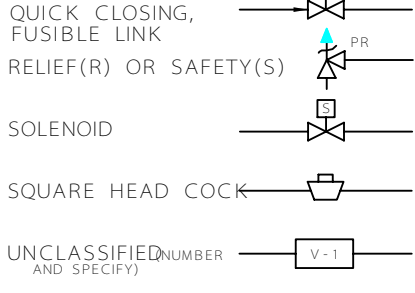
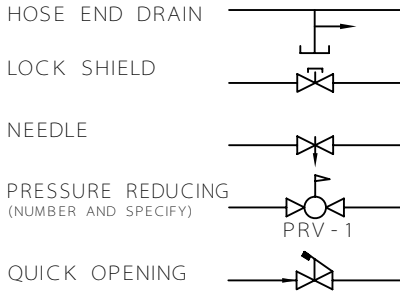
a) MANUAL  
NON-RISING STEM



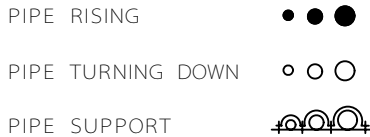
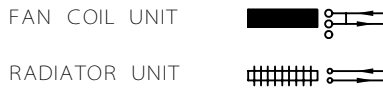
CONTROL, PNEUMATIC - ELECTRIC



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### D) MISCELLANEOUS



### E) FITTINGS

THE FOLLOWING FITTINGS ARE SHOWN WITH SCREWED CONNECTIONS. UNLESS OTHERWISE SPECIFIED THE SYMBOL FOR THE BODY OF A FITTING IS THE SAME FOR ALL TYPES OF CONNECTIONS. THE TYPES OF CONNECTIONS ARE OFTEN SPECIFIED FOR A RANGE OF PIPE SIZE, BUT ARE SHOWN WITH THE FITTING SYMBOL WHERE REQUIRED. FOR EXAMPLE, AN ELBOW WOULD BE:

FITTING	SYMBOL	FITTING	SYMBOL
FLANGED		WELDED <sup>a</sup>	
SCREWED		SOLDERED	
BELL & SPIGOT		SOLVENT CEMENT	
BUSHING		ELBOW, 90°	
CAP		ELBOW, 45°	
CONNECTION, BOTTOM		ELBOW, TURNED UP	
CONNECTION, TOP		ELBOW, TURNED DOWN	
COUPLING (JOINT)		ELBOW, REDUCING, (SHOW SIZES)	
CROSS		ELBOW, BASE	

<sup>a</sup>INCLUDES FUSION, SPECIFY TYPE.

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HEAT TRANSFER SURFACE (INDICATE TYPE) 

PITCH OF PIPE, RISE (R) DROP (D) 

PRESSURE GAUGE AND COCK 

PRESSURE SWITCH 

PUMP (INDICATE USE) 

PUMP SUCTION DIFFUSER 

SPOOL PIECE, FLANGED 

STRAINER 

STRAINER, BLOW OFF 

STRAINER, DUPLEX 


TANK (INDICATE USE) 

THERMOMETER 

THERMOMETER WELL, ONLY 

THERMOSTAT, ELECTRIC 

THERMOSTAT, PNEUMATIC 

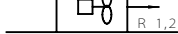
THERMOSTAT, SELF-CONTAINED 

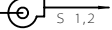
TRAPS, STEAM (INDICATE TYPE) 

UNIT HEATER (INDICATE TYPE) 

G) AIR MOVING DEVICES AND COMPONENTS

1) FANS (INDICATE USE)<sup>a</sup>

AXIAL FLOW 

CENTRIFUGAL 


PROPELLER 

ROOF VENTILATOR, INTAKE 

ROOF VENTILATOR, EXHAUST 

ROOF VENTILATOR, LOUVERED 

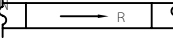
2) DUCTWORK

DIRECTION OF FLOW 

DUCT SIZE, (FIRST FIGURE IS SIDE SHOWN) 

DUCT SECTION, POSITIVE PRESSURE, (FIRST FIGURE IS TOP) 

DUCT SECTION, NEGATIVE PRESSURE 

CHANGE OF ELEVATION RISE (R) DROP (D) 

ACCESS DOORS VERTICAL OR HORIZONTAL 

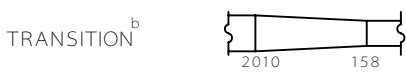
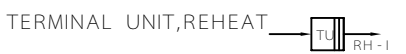
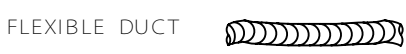
<sup>a</sup> UNITS OF MEASUREMENT ARE NOT SHOWN HEREIN, BUT SHOULD BE SHOWN ON DRAWINGS. THE FIRST OF THE TWO DIMENSIONS ON DUCTS INDICATES THE SIDE OF THE DUCT SHOWING; ON DUCT SECTIONS, THE TOP; ON GRILLES AND REGISTERS, THE HORIZONTAL EDGE..

C		
B		
A		
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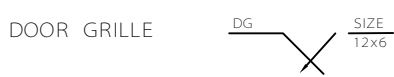
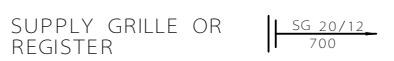
3) DAMPERS



<sup>b</sup> INDICATE FLAT ON BOTTOM OR TOP (FOB OR FOT) WHERE APPLICABLE.



4) GRILLES, REGISTER & DIFFUSERS <sup>a</sup>



<sup>a</sup> SHOW VOLUMETRIC FLOW RATE AT EACH DEVICE.

C		
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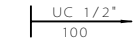
**IRANIAN PETROLEUM STANDARDS**

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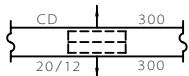
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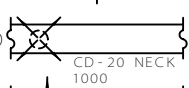
UNDERCUT DOOR



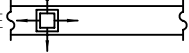
CEILING DIFFUSER, RECTANGULAR



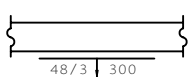
CEILING DIFFUSER, ROUND



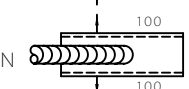
CEILING DIFFUSER, SQUARE



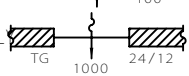
DIFFUSER, LINEAR



DIFFUSER AND LIGHT FIXTURE COMBINATION



TRANSFER GRILLE ASSEMBLY



H) REFRIGERATION EQUIPMENT

1) COMPRESSORS

CENTRIFUGAL



RECIPROCATING



ROTARY



ROTARY SCREW



2) CONDENSERS

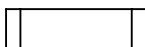
AIR COOLED



EVAPORATIVE

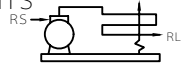


WATER COOLED,  
(SPECIFY TYPE)

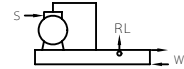


3) CONDENSING UNITS

AIR COOLED<sup>a</sup>

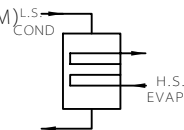


WATER COOLED<sup>a</sup>



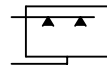
4) CONDENSER - EVAPORATOR

(CASCADE SYSTEM)<sup>L-S</sup>

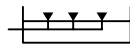


5) COOLING TOWERS

COOLING TOWER

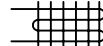


SPRAY POND

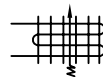


6) EVAPORATORS<sup>b</sup>

FINNED COIL



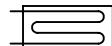
FORCED CONVECTION



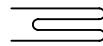
IMMERSION COOLING UNIT



PLATE COIL



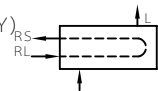
PIPE COIL



7) LIQUID CHILLERS

(EVAPORATOR ONLY)

DIRECT EXPANSION<sup>a</sup>

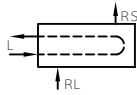


<sup>a</sup> L=LIQUID BEING COOLED, RL = REFRIGERANT LIQUID, RS = REFRIGERANT SUCTION.

<sup>b</sup> SPECIFY MANIFOLDING.

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FLOODED<sup>a</sup>



TANK, CLOSED

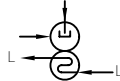


TANK, OPEN

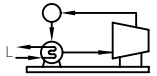


8) CHILLING UNIT

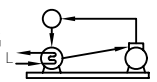
ABSORPTION



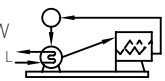
CENTRIFUGAL



RECIPROCATING



ROTARY SCREW



I) CONTROLS

1) REFRIGERANT CONTROLS

CAPILLARY TUBE



EXPANSION VALVE, HAND



EXPANSION VALVE, AUTOMATIC



EXPANSION VALVE THERMOSTATIC



FLOAT VALVE, HIGH SIDE



FLOAT VALVE, LOW SIDE



THERMOMETER



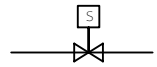
THERMAL BULB



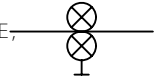
PRESSURE GAGE



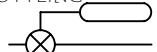
SOLENOID VALVE



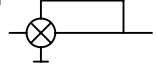
CONSTANT PRESSURE VALVE, SUCTION



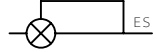
EVAPORATOR PRESSURE REGULATING VALVE, THERMOSTATIC, THROTTLING TYPE



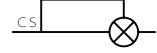
EVAPORATOR PRESSURE REGULATING VALVE, THERMOSTATIC, SNAP-ACTION TYPE



EVAPORATOR PRESSURE REGULATING VALVE, THROTTLING-TYPE, EVAPORATOR SIDE



COMPRESSOR SUCTION VALVE, PRESSURE-LIMITING, THROTTLING-TYPE, COMPRESSOR SIDE



THERMO-SUCTION VALVE



SNAP-ACTION VALVE



REFRIGERANT REVERSING VALVE

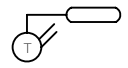


2) TEMPERATURE OR TEMPERATURE-ACTUATED ELECTRICAL OR FLOW CONTROLS

THERMOSTAT, SELF-CONTAINED

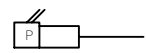


THERMOSTAT, REMOTE BULB



3) PRESSURE OR PRESSURE-ACTUATED ELECTRICAL OR FLOW CONTROLS


PRESSURE SWITCH



<sup>a</sup>L = LIQUID BEING COOLED, RL = REFRIGERANT LIQUID, RS = REFRIGERANT SUCTION.

C			IRANIAN PETROLEUM STANDARDS		
B			NO REVISION PERMITTED UNLESS APPROVED BY STANDARD ORGANIZATION		
A			ABBREVIATIONS & SYMBOLS FOR HVAC&R DRAWINGS	DATE	DRAWING No. SHT/REV.
REV	DESCRIPTION	DATE			IPS - D - AR - 010 10/12

PRESSURE SWITCH, DUAL (HIGH - LOW) 

PRESSURE SWITCH, DIFFERENTIAL OIL PRESSURE 

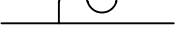
VALVE, AUTOMATIC REDUCING 

VALVE, AUTOMATIC BYPASS 

VALVE, PRESSURE - REDUCING 

VALVE, CONDENSER WATER REGULATING 

SIGHT GLASS 

FUSIBLE PLUG 

RUPTURE DISC 

RECEIVER, HIGH PRESSURE, HORIZONTAL 

RECEIVER, HIGH PRESSURE, VERTICAL 

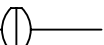
RECEIVER, LOW PRESSURE 

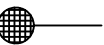
INTERCOOLER 

INTERCOOLER/DESUPERHEATER 

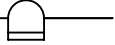
J) AUXILIARY EQUIPMENT

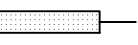
1) REFRIGERANT


FILTER 

STRAINER 


FILTER AND DRIER 

SCALE TRAP 

DRIER 

VIBRATION ABSORBER 

HEAT EXCHANGER 

OIL SEPARATOR 

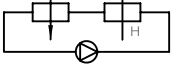
K) ENERGY RECOVERY EQUIPMENT

1) CONDENSER


CONDENSER, DOUBLE BUNDLE 

2) AIR TO AIR ENERGY RECOVERY

ROTARY HEAT WHEEL 

COIL LOOP 

HEAT PIPE 

C			<p>IRANIAN PETROLEUM STANDARDS </p> <p>NO REVISION PERMITTED UNLESS APPROVED BY STANDARD ORGANIZATION</p>
B			
A			
REV	DESCRIPTION	DATE	

FIXED PLATE

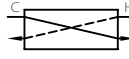


PLATE FIN, CROSS FLOW



## L) POWER SOURCES

MOTOR, ELECTRIC  
(NUMBER FOR IDENTIFICATION  
OF DESCRIPTION IN SPECIFICATIONS)



ENGINE (INDICATE FUEL)



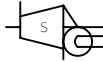
GAS TURBINE



STEAM TURBINE



STEAM TURBINE,  
CONDENSING



## M) ELECTRICAL EQUIPMENT <sup>a</sup>

SYMBOLS FOR ELECTRICAL EQUIPMENT SHOWN ON MECHANICAL DRAWINGS ARE USUALLY GEOMETRIC FIGURES WITH AN APPROPRIATE NAME OR ABBREVIATION, WITH DETAILS DESCRIBED IN THE SPECIFICATIONS. THE FOLLOWING ARE SOME COMMON EXAMPLES<sup>b</sup>

MOTOR CONTROL  MC TIME CLOCK  TC

DISCONNECT SWITCH, UNFUSED  DS AUTOMATIC FILTER PANEL  AFP

DISCONNECT SWITCH, FUSED  DSF LIGHTING PANEL  LP

POWER PANEL  PP

<sup>a</sup> FOR PREFERRED SYMBOLS OF COMMON ELECTRICAL PARTS REFERENCE IS MADE TO ARI STANDARD 130-82. (SEE GRAPHIC SYMBOLS FOR HVAC&R EQUIPMENT).

<sup>b</sup> NUMBER EACH SYMBOL IF MORE THAN ONE; SEE GRAPHIC SYMBOLS FOR PLUMBING FIXTURES FOR DIAGRAMS USED IN ARCHITECTURE AND BUILDING CONSTRUCTION (ANSI Y32.4 - 1977).

C				IRANIAN PETROLEUM STANDARDS 			
B				NO REVISION PERMITTED UNLESS APPROVED BY STANDARD ORGANIZATION			
A				DATE	DRAWING No.	SHT	REV.
REV	DESCRIPTION	DATE	ABBREVIATIONS & SYMBOLS FOR HVAC&R DRAWINGS		IPS - D - AR - 010	12	12