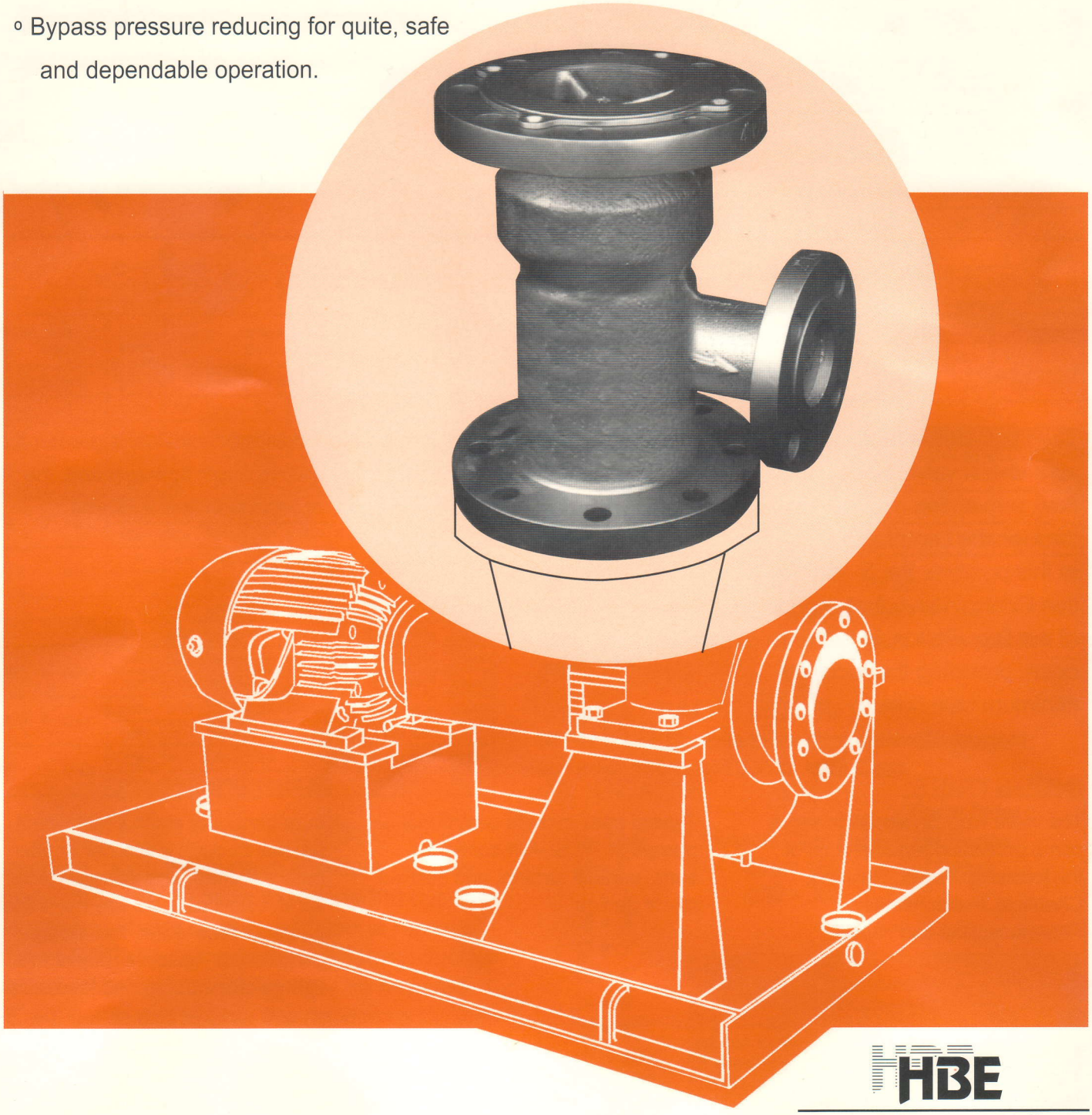
Automatic Recirculation Valves

The NLPM Series Centrifugal Pump Protection Valve

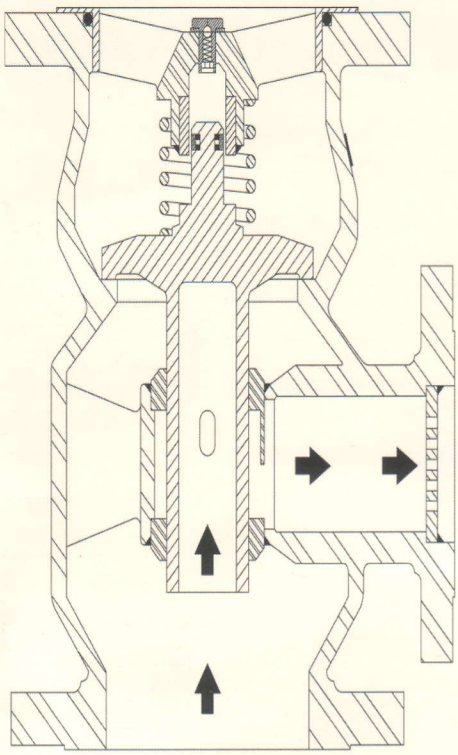
Providing:

- Check valve for main flow reverse flow protection.
- Main flow sensing element for flow detection.
- Bypass modulating flow control for minimum flow pump protection.
- Bypass pressure reducing for quite, safe and dependable operation.



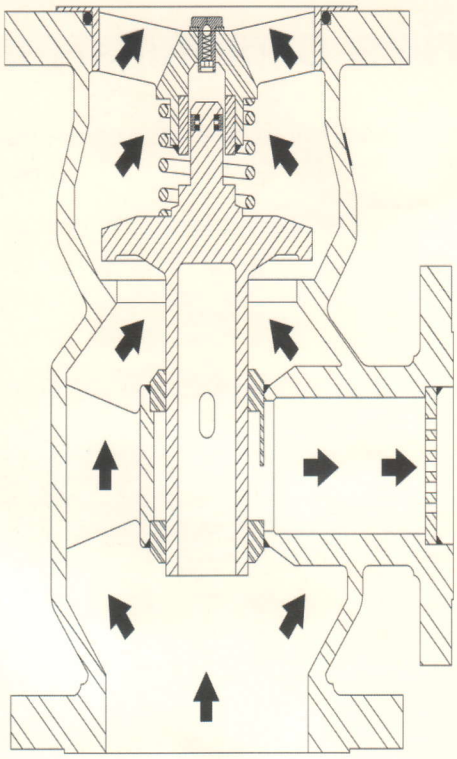
HBE ENGINEERING Inc.

OPERATIONAL OVERVIEW



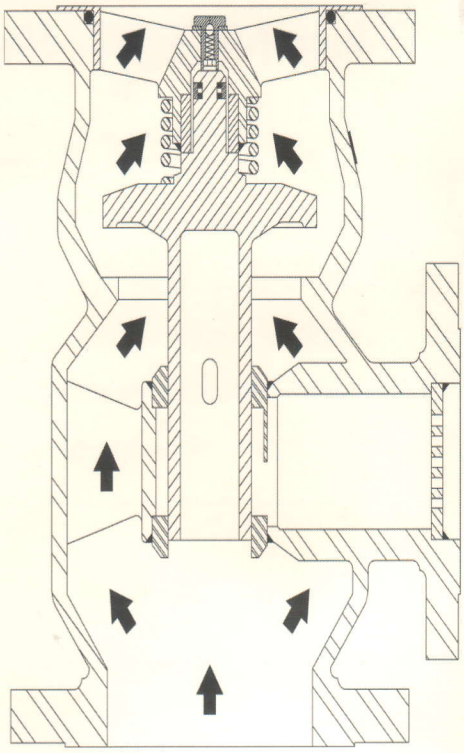
No Main Flow

The Disc-Piston Assembly acts as a check valve for the main flow, preventing reverse flow through the centrifugal pump. In this position, the Recirculation Control Valve that is part of the Disc-Piston, is fully open, providing the required minimum safe flow.



Modulating Flow

Main flow is less than required minimum flow. Main flow, plus bypass flow, equal or exceed the required minimum safe flow.



Main Flow Only

When the main flow is greater than the minimum flow required, the recirculation flow is closed.

INDUSTRIES:

The valve was developed to serve pump protection requirements of the following: Power, Refining, Chemical, Petrochemical, Pharmaceutical and HVAC.

USAGE:

Typical uses include centrifugal pumps of ANSI-API configurations, vertical turbine, and canned motor design.

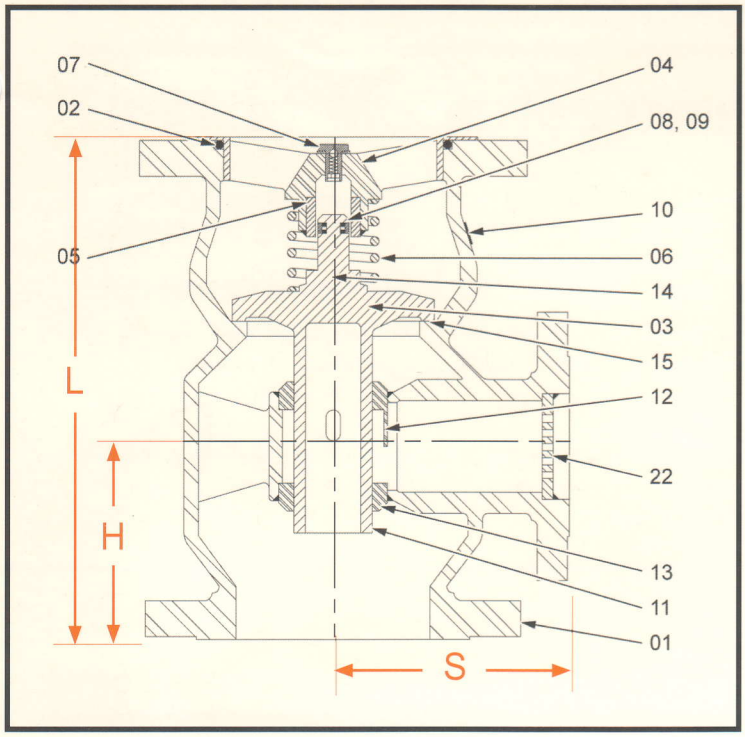
APPLICATIONS:

In general any clean liquid which passes through a strainer or filter before entering the valve. Typical services include; but are not limited to; boiler feed water, raw water, condensate, gasoline, diesel fuel, light hydrocarbons, and feed stocks.

INSTALLATIONS:

Typical installations include: Transfer, Feeding, Circulating, Boosting, and Loading Pumps.

MATERIALS OF CONSTRUCTIONS



Item	Qty	Description	Materials	Specifications
1	01	Body	Carbon Steel	ASTM A216 WCB
2	01	O-Ring	By Application	---
3	01	Disc	304 Stainless Steel	ASTM A276
4	01	Upper Guide	Carbon Steel	ASTM A216 WCB
5	01	Upper Sleeve	Stainless Steel	17-4PH
6	01	Spring	Stainless Steel	AISI 302
7	01	Dampening Valve	Stainless Steel	AISI 304
8	01	Pressure Ring	By Application	---
9	01	Slide Ring	Teflon	---
10	01	Name Plate	Stainless Steel	AISI 304
11	01	Piston	304 Stainless Steel	ASTM A276
12	01	Bypass Ring	Stainless Steel	17-4PH
13	01	Lower Slide Ring	Stainless Steel	17-4PH
14	01	Disc Guide	304 Stainless Steel	ASTM A276
15	01	Seat	Stainless Steel	AWS E 316 L
22	01	Orifice	Stainless Steel	AISI 304

DIMENSIONS & WEIGHTS

NOMINAL SIZE Inch (MM)		ANSI CLASS	DIMENSIONS Inch (MM)						WEIGHT Lb (Kg)	
Main	By-pass		L		H		S			
2 (50)	1 (25)	150	7.2	(183)	3.6	(92)	3.9	(100)	29	(13)
		300	8.8	(223)	4.3	(110)	4.9	(125)	40	(18)
3 (80)	1 (40)	150	8.0	(202)	3.9	(98)	5.1	(130)	42	(19)
		300	10.2	(259)	5.0	(126)	5.9	(150)	51	(23)
4 (100)	2 (50)	150	12.1	(308)	5.0	(127)	6.5	(165)	62	(28)
		300	12.4	(316)	5.7	(145)	6.7	(170)	88	(40)
6 (150)	4 (100)	150	14.3	(362)	6.6	(167)	8.0	(204)	99	(45)
		300	14.4	(366)	7.2	(182)	8.3	(212)	154	(70)
8 (200)	4 (100)	150	17.3	(440)	6.5	(165)	8.7	(220)	176	(80)
		300	18.9	(480)	7.7	(195)	9.8	(250)	264	(120)
10 (250)	6 (150)	150	22.6	(575)	7.9	(200)	10.0	(255)	397	(180)
		300	24.0	(610)	9.1	(230)	11.0	(280)	573	(260)
12 (300)	8 (200)	150	31.3	(795)	10.4	(265)	13.7	(348)	639	(290)
		300	32.0	(813)	11.1	(283)	14.2	(360)	683	(310)
14 (350)	10 (250)	150	35.3	(896)	12.5	(317)	14.8	(376)	705	(320)
		300	36.1	(916)	13.2	(336)	15.3	(388)	782	(355)

BACK PRESSURE ACCESSORIES

Depending upon the bypass pressure differential, an orifice can be installed inside the bypass as illustrated above (22). In addition, a remote orifice or BPR (back pressure regulator) which is installed in the bypass piping may be required. HBE will quote and supply the necessary orifice or BPR with illustrative drawings and installation instructions to assure the valve operates quietly without two phase flow during bypass operation.

SIZING & FLOW RATINGS

	INLET-OUTLET SIZE	in	2"	3"	4"	6"	8"	10"	12"	14"
MAIN	Maximum Flow	GPM	162	324	613	1082	2434	4327	8475	10456
		M / h	37	74	139	246	553	983	1925	2375

	SIZE	in	1"	1.5"	2"	4"	4"	6"	8"	10"
BYPASS	Maximum Flow	CV	8.0	12.0	17.0	36.4	91	170	425	565
		GPM	80	90	166	318	648	1300	2450	3750
		M / h	18.2	20.4	37.7	72.2	147.2	295.3	556.4	851.7

The size of the valve is selected on the basis of the required main flow, bypass Cv, and minimum flow.

Flow values indicated above are for fluids with a specific gravity of one (1).

VALVE MODEL LEGEND

NLPM – Low pressure modulating automatic recirculation valve. 150 lb. and 300 lb. ANSI Class.

Size Code	Pressure Class Code	Quote Order File Number
04= 1"	015 = 150	(xxxx)
06 = 1-1/2"	030 = 300	
08 = 2"		
12 = 3"		
16 = 4"		
24 = 6"		
32 = 8"		
40 = 10"		
48 = 12"		
56" = 14"		

EXAMPLE

10" – 150 Lb. Flanged valve
File 12788
Model NLPM-40-015-12788
A written description of the material of construction details follows the model number.

How To Order and Specify

The centrifugal pump shall be protected by the NLPM Series Automatic Recirculation valve which is completely self-contained and fully automatic via flow activation.

The dedicated valve per pump provides reverse flow protection and prevents overheating during low process demands.

Operation of the valve bypass will be modulating so the sum of the main and bypass flow will never be less than minimum flow requirements of the pump.

Valve design will incorporate a single body, spring assisted check valve disc, and in-line bypass. Materials of construction will consist of a cast carbon steel body ASTM A216 grade WCB with stainless steel internals. If service conditions dictate, other materials are available such as stainless steel, low temperature steel and nickel alloys.

The valve will be designed to operate without flashing or cavitation occurring during bypass operation. Any necessary accessories such as orifices or back pressure regulators will be provided by HBE to prevent flashing or cavitation in the bypass piping.

Required Application Data

Main Flow

Minimum	_____	GPM (m^3/hr)
Maximum	_____	GPM (m^3/hr)
Normal	_____	GPM (m^3/hr)

Minimum Pump Flow _____ GPM (m^3/hr)

Pump Discharge Pressure @:

Normal Flow	_____	PSIG (kpa)
Bypass Flow	_____	PSIG (kpa)
Shut Off	_____	PSIG (kpa)

Bypass Backpressure _____ PSIG (kpa)

Temperature

Normal	_____	°F (°C)
Maximum	_____	°F (°C)

Liquid _____

* Specific Gravity	_____	
* Vapor Pressure	_____	psia
* Viscosity	_____	centipoise

(* if other than water)

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