

HBD – Balancing Damper

Model: HBD-155

The Holyoake HBD-155 is a control damper designed for airflow balancing. It can be manually positioned, or motorised options are available.

The HBD-155 frame has been designed to align with 35 mm proprietary duct flange systems for ease of installation.

Standard Construction

- Frame:** 6063 T5 extruded aluminium with square cut ends, mechanically joined with screws tapped into screw pipes.
- Blades:** 6063 T5 extruded aluminium with a full cavity hex to prevent the rotation of the blades on the shaft.
- Linkage:** Concealed in frame, with stainless steel cranks with link pins and aluminium control bars.
- Axles:** Hexagonal.
- Bearings:** Two piece moulded glass reinforced nylon, pressed into frame, with the outer sleeve locked with locating ribs (-8° to 120°C).
- Control Shaft:** **[Standard]:** Round Drive Shaft 120 mm, complete with Motor Mounting Plate - HCD32 Kit (HCD23 & 28)
[Optional]:
(1) Hex Extension Shaft 23, 44, 93, or 300 mm, complete with Motor Mounting Plate - HCD 25, 26, 22, or 27, with a HCD 23.
(2) Hex Extension Shaft (93 mm) complete with Quadrant Arm and Plate – HCD31 Kit (HCD22/23/24).
- Blade Rotation:** **[Standard]:** Opposed
[Optional]: Parallel (specify if required).
- Finish:** Mill
- Minimum Size:** 150 mm wide and 155 mm high (Air Stream).
- Maximum Size:** 1200 mm wide and 1775 mm high (Air Stream).
- General:** Nominal size is the duct air stream size. The actual overall size is the air stream size, plus 70 mm.
- Maximum ΔP** 1000 Pa at 1200 mm wide.

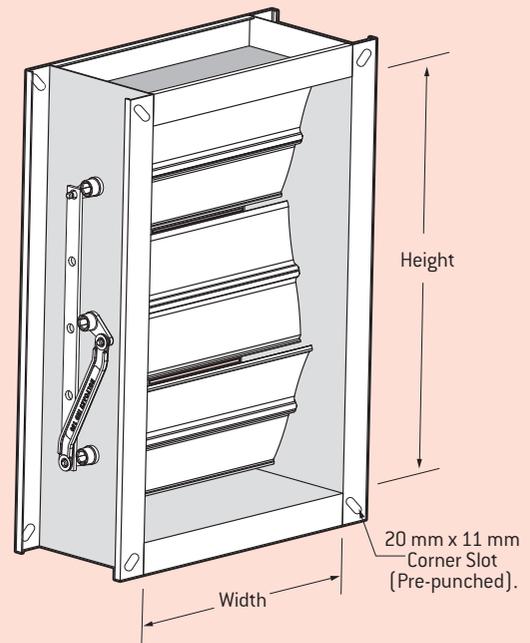
For other features contact your local Holyoake branch.

Duct Mounting

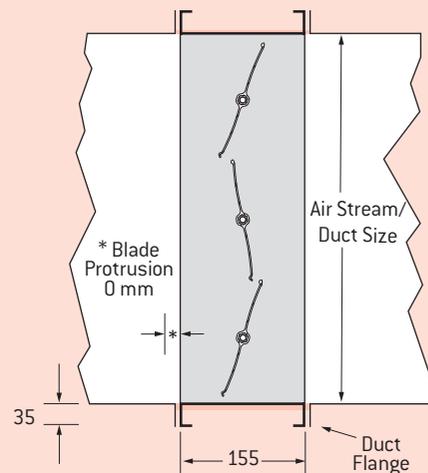
The HBD-155 has been specifically designed to be installed using 35mm proprietary duct flanging systems. This means that the damper can be installed in exactly the same way as a piece of flanged duct. This way of mounting the HBD-155 provides an easy installation method and maintains the maximum amount of free area.

The HBD-155 can also be mounted inside a duct in much the same way as an HCD-150 Standard Channel damper.

Balancing Control Damper



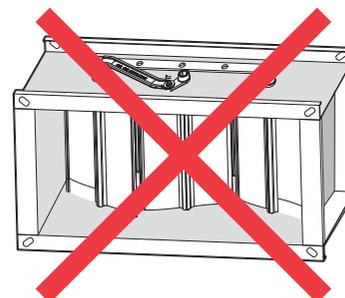
Dimensions



Installation

Dampers must be installed square and free from racking. Typically the method of driving the damper depends on its application. Where the actuator is to be located externally, specify Round Drive Shaft 120 mm. For manual control, use Hex Extension Shafts, Quadrant Arm and Plate. A drive shaft must be fitted to a “power blade” axle on the linkage side of the damper.

Motorised HBD 155 dampers must not be installed with the axles vertical.



Model: HBD-155

AREA FACTOR TABLE																										
Duct Height (mm)	No. of Blades	Duct Width (mm)																								
		300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500
160	1	23.12	19.81	17.34	15.41	13.87	12.61	11.56	10.67	9.91	9.25	8.67	8.16	7.71	7.30	6.93	6.60	6.30	6.03	5.78	5.55	5.33	5.14	4.95	4.78	4.62
306	2	12.15	10.41	9.11	8.10	7.29	6.63	6.07	5.61	5.21	4.86	4.56	4.29	4.05	3.84	3.64	3.47	3.31	3.17	3.04	2.92	2.80	2.70	2.60	2.51	2.43
452	3	8.24	7.06	6.18	5.49	4.94	4.49	4.12	3.80	3.53	3.30	3.09	2.91	2.75	2.60	2.47	2.35	2.25	2.15	2.06	1.98	1.90	1.83	1.77	1.70	1.65
598	4	6.23	5.34	4.67	4.16	3.74	3.40	3.12	2.88	2.67	2.49	2.34	2.20	2.08	1.97	1.87	1.78	1.70	1.63	1.56	1.50	1.44	1.39	1.34	1.29	1.25
744	5	5.01	4.30	3.76	3.34	3.01	2.73	2.51	2.31	2.15	2.01	1.88	1.77	1.67	1.58	1.50	1.43	1.37	1.31	1.25	1.20	1.16	1.11	1.07	1.04	1.00
890	6	4.19	3.59	3.14	2.79	2.52	2.29	2.10	1.93	1.80	1.68	1.57	1.48	1.40	1.32	1.26	1.20	1.14	1.09	1.05	1.01	0.97	0.93	0.90	0.87	0.84
1036	7	3.60	3.09	2.70	2.40	2.16	1.96	1.80	1.66	1.54	1.44	1.35	1.27	1.20	1.14	1.08	1.03	0.98	0.94	0.90	0.86	0.83	0.80	0.77	0.75	0.72
1182	8	3.16	2.71	2.37	2.11	1.89	1.72	1.58	1.46	1.35	1.26	1.18	1.11	1.05	1.00	0.95	0.90	0.86	0.82	0.79	0.76	0.73	0.70	0.68	0.65	0.63
1328	9	2.81	2.41	2.11	1.87	1.69	1.53	1.41	1.30	1.20	1.12	1.05	0.99	0.94	0.89	0.84	0.80	0.77	0.73	0.70	0.67	0.65	0.62	0.60	0.58	0.56
1474	10	2.53	2.17	1.90	1.69	1.52	1.38	1.27	1.17	1.09	1.01	0.95	0.89	0.84	0.80	0.76	0.72	0.69	0.66	0.63	0.61	0.58	0.56	0.54	0.52	0.51
1620	11	2.30	1.98	1.73	1.54	1.38	1.26	1.15	1.06	0.99	0.92	0.86	0.81	0.77	0.73	0.69	0.66	0.63	0.60	0.58	0.55	0.53	0.51	0.49	0.48	0.46
1766	12	2.11	1.81	1.59	1.41	1.27	1.15	1.06	0.98	0.91	0.85	0.79	0.75	0.70	0.67	0.63	0.60	0.58	0.55	0.53	0.51	0.49	0.47	0.45	0.44	0.42

[All Performance data assumes a flanged connection, where duct dimensions are the same as the open area of the damper].

To determine the pressure drop through a fully open HBD-155, use the following procedure:

1. Find the Area Factor from the table above, enter Duct Width and Height.
2. Determine the Conversion Velocity (CV) by multiplying the Area Factor by the air flow in m³/s [CV = Area Factor x m³/s].
3. Enter the pressure drop chart below with the Area Factor and establish the intersection with the Conversion Velocity (CV) line just determined. Read the pressure drop (Pa) on the left hand side of the chart.

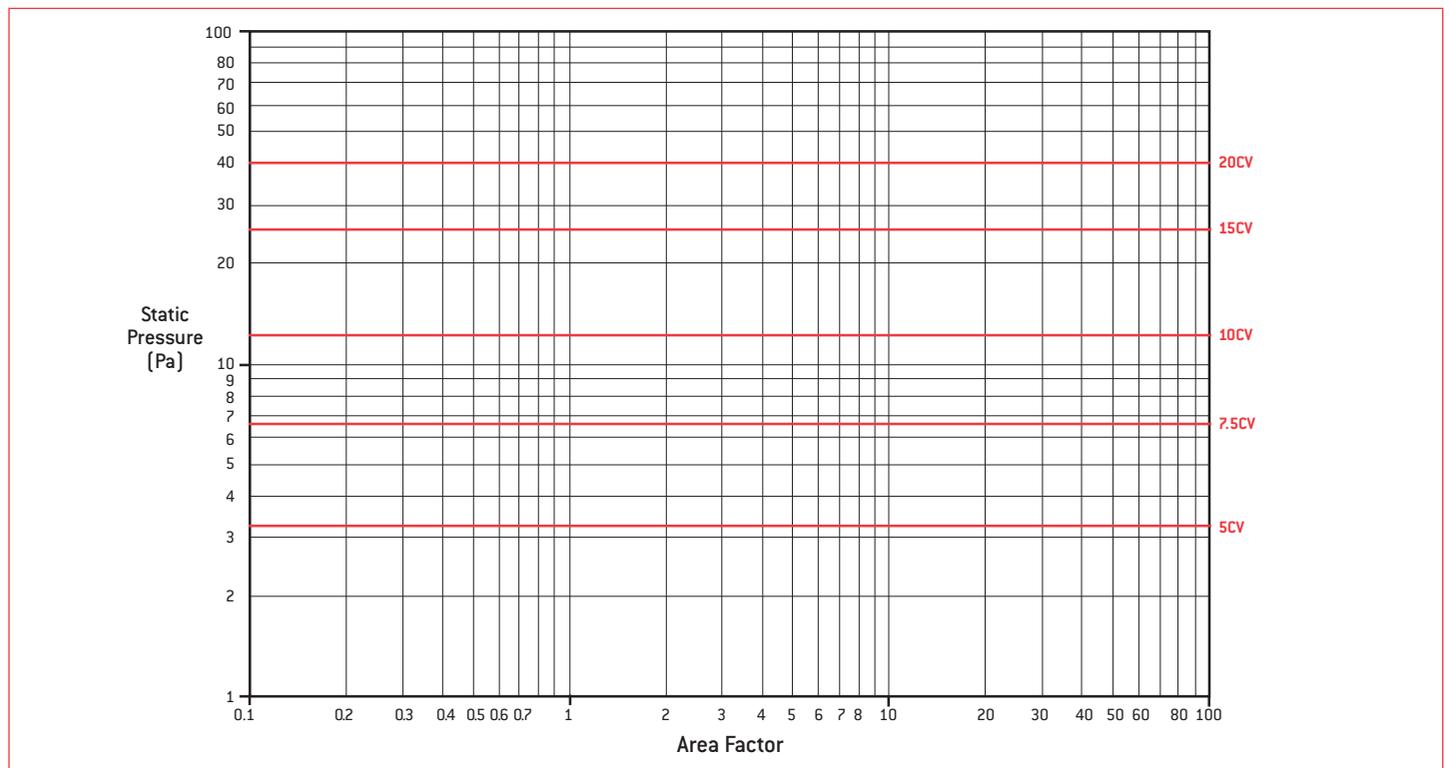
Note: Interpolations while not precise are adequate for most calculations.

Example:

Find the pressure drop across a 600 mm wide x 598 mm high model HBD-155, passing an airflow of 4.0 m³/s.

1. From the table using the interpolation, the Area Factor is 3.12.
2. CV = 4.0 x 3.12 = 12.5.
3. From the chart below, the pressure drop reads 17 Pa.

Guide Product Weights	
HBD 155 Balancing Control Damper	Approximate Weight in Kg
1000 x 500	8.3



Notes

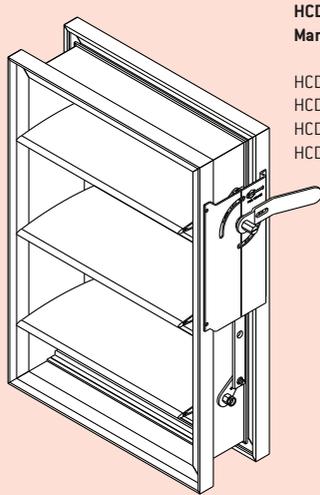
1. Static Pressure and Conversion Velocities are for air density of 1.2kg/ m³.
2. Pressure drop data is for dampers tested with ductwork on both the up and downstream sides. These values need to be suitably increased where dampers are mounted with ductwork on one side only, or when

mounted onto plenum walls. (Refer to SMACNA, or ASHRAE system design guides).

3. Data is for the specific sizes in the Area Factor Table. For other sizes use the next size down and make a proportional adjustment based on the approximate increase in free area.

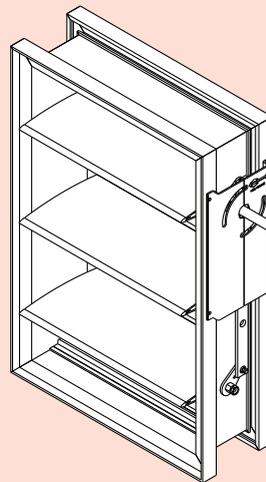
Standard Drive & Coupling Components

Standard Hardware



HCD-31 KIT
Manual Quadrant

HCD-02
HCD-22.36
HCD24
HCD16



HCD-32 KIT
Actuator

HCD-02
HCD-01.120
HCD-16

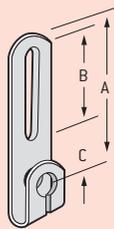


HCD-22
Hex Drive Shaft
36mm or 90mm



HCD-01
Actuator Drive Shaft
60mm or 120mm

HCD-18
Slotted Crank Arm
12.5 mm Hole



HCD-19
As Above with
25 mm Hole

	A	B	C
HCD 18	92	67	15
HCD 19	142	79	52

HCD-09
Standard Jackshaft
Bearing (25.4 mm)



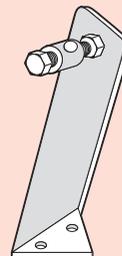
HCD-07
Standard Jackshaft
Link Arm
25.4 mm Dia



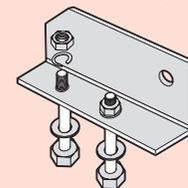
HCD-20
Swivel



HCD-17
Control Arm
& Swivel



HCD-15
Coupler Bracket Assembly



Component	Description	Component	Description
HCD31	Manual Quadrant Kit includes HCD02, HCD22.36, HCD24, HCD16	HCD15	Coupler Bracket Assembly
HCD32	Actuator Kit includes HCD02, HCD01, HCD16	HCD16	Two Piece Hex Axle Bearing [-8 - 220°C]
HCD01	Round Actuator Drive Shaft 60, 120mm	HCD1602	Two Piece Round Axle Bearing [-8 - 220°C]
HCD02	Aluminium bracket for manual or actuated operation of damper	HCD17	Control Arm and Swivel
HCD04	Hex Coupler 29, 47mm	HCD18	Slotted Crank Arm 12.7mm Hole
HCD05	Tie Rod Arm	HCD19	Slotted Crank Arm 25.4mm Hole
HCD06	Tie Rod Bearing	HCD20	Swivel
HCD07	Standard Jackshaft Link Arm 25.4mm Dia	HCD21	8mm Stainless Steel Rod
HCD08	Mini Jackshaft Link Arm 12.7mm Dia	HCD22	Hex Manual Quadrant Drive Shaft 36,90mm
HCD09	Standard Jackshaft Bearing 25.4mm	HCD24	Manual Crank Arm
HCD10	Mini Jackshaft Bearing 12.7mm	HCD24EXT	PRD Counter Weight Arm
HCD11	25.4 x 1.8mm Stainless Steel Tubing	HCD34	One Piece Round Linkage Bearing [-8 - 220°C]
HCD11A	12.7 x 1.2mm Stainless Steel Tubing	HCD35	Manual Quadrant for 1/2" Shaft
HCD12	Stainless Steel Split Pin	HCDSSWIRECLIP	HCD Stainless Steel Wire Clip
HCD13E	Stainless Steel Axle & Crank	HCD150LINKARM	Aluminium Link Arm to suit HCD150
HCD13F	Stainless Steel Axle & Crank (Opposite Hand)	HCD75LINKARM	Aluminium Link Arm to suit HCD75
HCD13G	Stainless Steel Plain Hex Axle		

HBD & HCD

Product Ordering Key and Suggested Specifications

HBD-155

Holyoake
Balancing
Dampers with
155 mm
Aluminium
Blades

**OPPOSED
PARALLEL**

Blade Rotation:
Opposed (Standard)
Specify Parallel

W x H

Nominal
Duct
Size

CONTROL

Quadrant Arm and Plate.
Round Drive Shaft 120 mm.
Hex Ext Shaft,
(23, 44, 93 or 300 mm).



Balancing Dampers shall be of extruded aluminium construction. Frames shall be suitable for duct flange mounting. Blades shall be fixed to 11 mm hexagonal shafts held by two piece acetal self lubricating bearings, with outer shells fluted to prevent rotation.

Linkages shall be out of the airstream. The damper may be furnished with a manual locking quadrant arm, a round shaft and plate, or a hexagonal shaft and plate, suitable for actuator mounting.

All shall be type HBD-155 as manufactured by Holyoake.

**HCD-75
HCD-150**

Holyoake
Control
Dampers
with 75 or
150 mm
aluminium
airfoil blades.

**CHANNEL
LOW PROFILE CHANNEL
FLANGE SURROUND**

Frame
Style

**OPPOSED
PARALLEL**

Blade Rotation:
**Opposed
(Standard)** Specify
Parallel

W x H

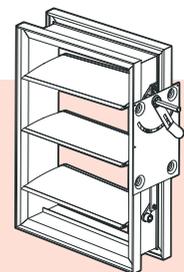
Nominal
Duct
Size

CONTROL

Quadrant Arm and Plate.
Round Drive Shaft 120mm.
Hex Ext Shaft,
(23, 44, 93, or 300 mm).

**SPECIAL
CONSTRUCTION
OPTIONS**

For smoke damper see
page 328H - 329H



Volume Control Dampers shall be low leakage type extruded aluminium construction, with single piece airfoil blades, fitted with self inflating edge seals. Blades shall be fixed to 11 mm hexagonal shafts, held by two piece acetal self lubricating bearings, with outer shells fluted to prevent rotation. Frames shall be suitable for either internal fixing within ductwork, or external duct flange mounting and shall be fitted with flexible aluminium side seals. Linkages shall be out of the airstream. Leakage shall be no greater than 0.04 m³/s/m² at 1500 Pa Δp, or typically 0.45 % of full flow (at 5 m/s) with 500 Pa Δp. The damper may be furnished with a manual locking quadrant arm, a round shaft and plate, or a hexagonal shaft and plate, suitable for actuator mounting.

All shall be type HCD-75, or HCD-150, as manufactured by Holyoake.

HCD-225

Holyoake
Heavy Duty
Control
Dampers
with 225 mm
Airfoil Blades

PARALLEL

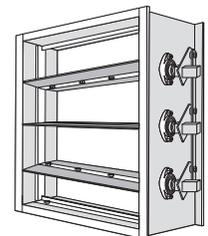
Blade Rotation
(No Opposed
Option)

W x H

**Nominal
(Overall Size)**

CONTROL

Electric Motor,
Pneumatic Actuator,
(Further discussion
required with local
Holyoake branch).



Heavy Duty Volume Control Dampers shall be constructed from extruded aluminium. Frames shall be suitable for duct flange mounting and be 6 mm thick. Blades shall be Parallel Airfoil 3 mm thick, with internal strengthening and fitted with externally mounted Heavy Duty Spherical Ball Bearings. Axle crank plates shall be 55 x 6 mm mild steel plate, with brass bearings; mounted outside of the airstream, providing a robust, long lasting operating mechanism, able to handle high turbulence/pressure and velocity. The damper shall be available with a range of control options to suit specialist applications.

All shall be type HCD-225 as manufactured by Holyoake.