About the CDR Belt Drive Airflow Measurement Charts

The charts are derived from the Airflow Performance tables found in the Technical Guide and Installation Instructions. The charts are only valid for the range of data listed in the Airflow Performance tables:

- Airflow volume ranging from 300 CFM to 500 CFM per ton of nominal cooling capacity
- External static pressure ranging from 0.2 inches water column to 2.0 inches water column

The indoor blower motor Service Factor Amperage (SFA) rating can not be exceeded. The charts may list conditions in excess of indoor blower motor SFA for information-only use.

Use of the CDR Belt Drive Airflow Measurement Charts

The airflow measured through use of these charts should also be confirmed through another method of airflow measurement such as:

- Heat section temperature rise
- Proper leaving air temperature for cooling
- Duct traverse
- Balometer measurement of supply duct outlets

The 1st, 2nd, 4th, 5th and 9th characters of the unit model nomenclature and the duct connection used in application determine the specific chart to be used.

character 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
model ZXG08D2B1AA1A111A1A

- unit model listed in the upper right of each chart
- indoor blower motor VFD option
  - 1 = none
  - 3 = IntelliSpeed VFD

Each chart for units without indoor blower motor VFD lists the duct connection used in application in the upper right below the unit model:

- Side (horizontal) Duct Connection
- Bottom (thru-the-curb) Duct Connection

Upper right heading of the chart used in the example that follows:

ZX_08 (7-½ ton)
Bottom Duct Connection

To account for slight differences in VFD power consumption, the charts for units with indoor blower motor VFD are also specific for the standard, medium or high static indoor blower factory option:

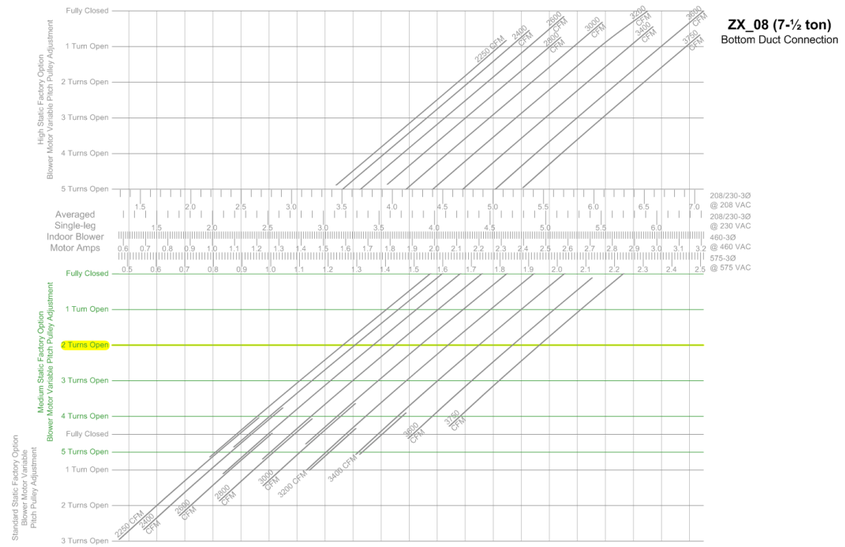
ZY_12 (10 ton)
VFD Medium Static
Bottom Duct Connection

The 8th character of the unit model nomenclature determines the horizontal section for the standard, medium or high static indoor blower factory option of the specific chart for units without indoor blower motor VFD to be used.

character 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
model ZXG08D2B1AA1A111A1A

- indoor blower static option
  - A = Standard Static
  - B = Medium Static
  - C = High Static

The example uses the green lines and text of the medium static indoor blower factory option horizontal section of the chart.



User Guide ZX08 a

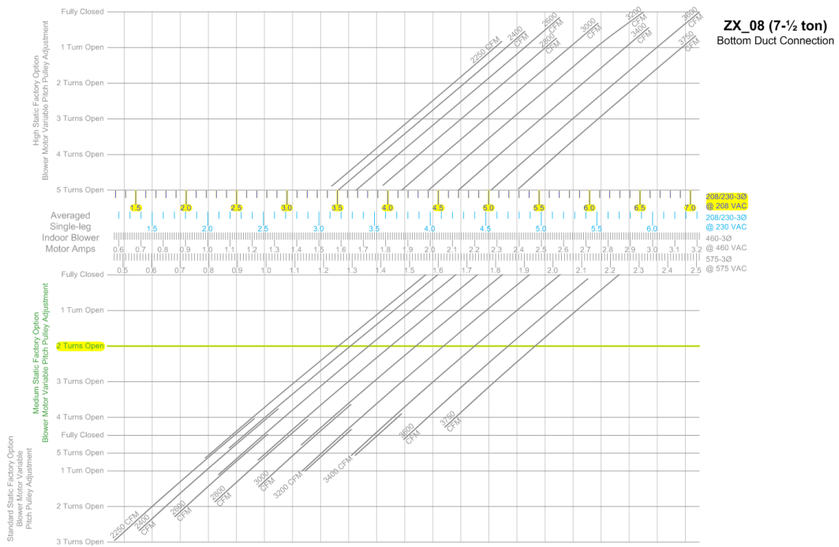
Field observation of the number of turns open blower motor variable pitch pulley adjustment determines the specific horizontal line of the chart to be used. Highlighted in yellow, 2 turns open is used in the example.

The 7th character of the unit model nomenclature determines the amperage scale of the specific chart to be used:

character 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
model ZXG08D2A1AA1A111A1A

- unit voltage
  - 1 = 208/230-1Ø
  - 2 = 208/230-3Ø
  - 4 = 460-3Ø
  - 5 = 575-3Ø

The example uses the blue lines and text of the 208/230-3Ø amperage scales of the chart.



User Guide ZX08 b

Particularly for 208/230 VAC units, field observation of the applied voltage determines the specific amperage scale of the chart to be used. Highlighted in yellow, 208 VAC is the applied voltage for the example so the @ 208-3Ø scale is used.

Accuracy in measurement of the blower motor amperage is crucial to the accuracy of the chart. Centering the wire in the amp-clamp and keeping the amp-clamp away from energized contactor coils or other induction sources aids in the accuracy of amperage measurement.

The “Averaged, Single-leg Indoor Blower Motor Amps” heading accompanies the amperage scales of the charts. Averaged amps is used because there is typically some variation in leg-to-leg amperage measured under field conditions. To arrive at the averaged, single-leg indoor blower motor amps for 3-phase motors:

Line 1 measured indoor blower motor amps
\+ Line 2 measured indoor blower motor amps
\+ Line 3 measured indoor blower motor amps

Total ÷ 3 = Averaged, Single-leg Indoor Blower Motor Amps

Averaged, Single-leg Indoor Blower Motor Amps for the example:

Line 1 measured indoor blower motor amps: 4.2
\+ Line 2 measured indoor blower motor amps: 4.1
\+ Line 3 measured indoor blower motor amps: 4.6

Total: 12.9 ÷ 3 = 4.3 Averaged, Single-leg Indoor Blower Motor Amps

The charts for units with indoor blower motor VFD are only valid at 60 HZ output from the VFD. The point for amperage measurement is on the incoming (line) side of the VFD and the averaged, single-leg amperage is used in the charts. The charts for units with indoor blower motor VFD account for the amperage of indoor blower motor and the VFD at 60 HZ output.

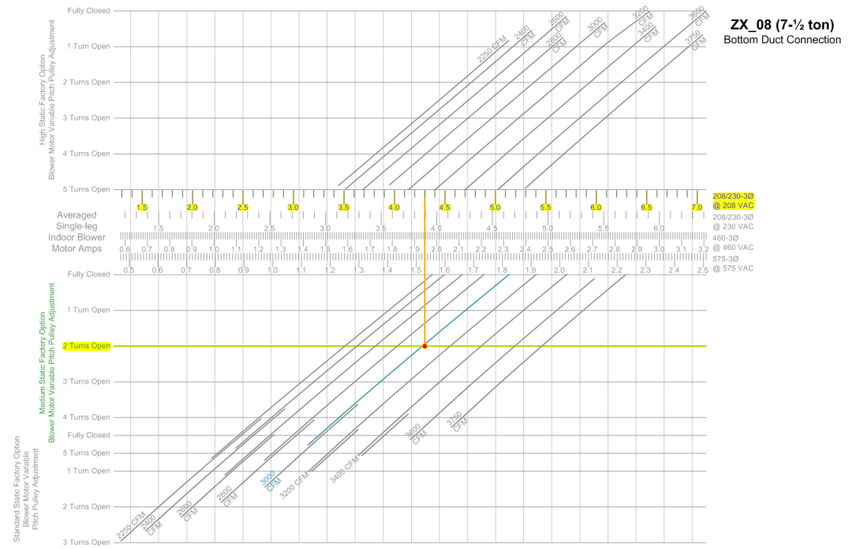
Note that the amperage scales of the charts are set at a nominal applied voltage. Actual applied voltage variances of up to +/-10% from nominal can be expected under field conditions. For each 1% applied voltage is above nominal voltage, amperage decreases 1% (close approximation). For each 1% applied voltage is below nominal voltage, amperage increases 1% (close approximation). Compensation of the amperage measured to the scales of the chart will be needed when applied voltage is above or below nominal voltage. Examples:

Applied voltage is 5% above nominal; averaged, single-leg indoor blower motor amps is 2.0 A – on the chart, 1.9 A (95% of the measured 2.0 A) is used in compensation

Applied voltage is 5% below nominal; averaged, single-leg indoor blower motor amps is 2.0 A – on the chart, 2.1 A (105% of the measured 2.0 A) is used in compensation

To complete airflow measurement using these charts, a vertical line is draw from the averaged, single-leg indoor blower motor amps location on the amperage scale to intersect with the turns open horizontal line. This intersection in relation to the angled/curved CFM lines indicates the airflow measured.

Once complete, the example indicates slightly more than 3000 CFM.



User Guide ZX08 c

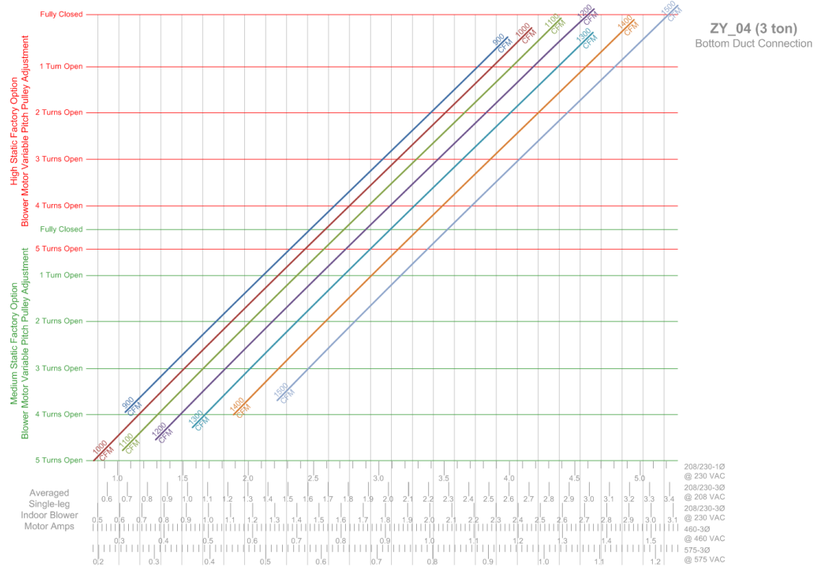
The indoor blower motor variable pitch pulley is turned open or closed if adjustments to airflow are needed. The new turns open data and re-measurement of the indoor blower motor amps are then used in the specific chart to determine the airflow following adjustment.

Indoor airflow in the range of 350 to 450 CFM per ton of cooling capacity is recommended for units at normal altitudes and having 100% return air.

CFM Lines in the CDR Belt Drive Airflow Measurement Charts

Whether the angled/curved CFM lines are continuous, staggered and/or split is dependant on the efficiency of the motors used for the standard, medium or high static indoor blower factory options.

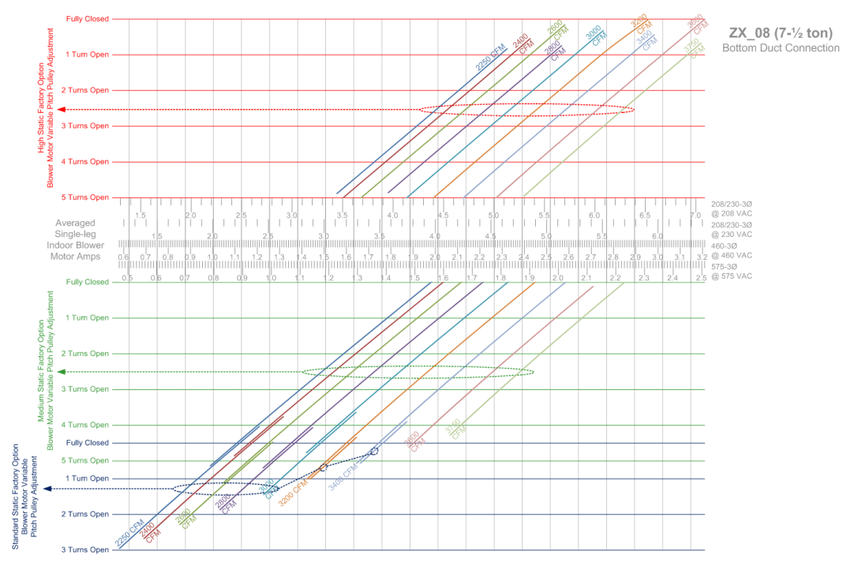
The CFM lines are continuous through the chart when the same efficiency motors are used for the standard, medium and/or high static indoor blower factory options.



User Guide ZY04

The CFM lines are staggered through the chart when there are minor efficiency differences in the motors used for the standard, medium and/or high static indoor blower factory options. With staggered CFM lines, the lines that originate or extend through the horizontal standard, medium and/or high static indoor blower factory option section of the chart apply to that specific static option.

In the example illustration below, the CFM lines are staggered between the horizontal standard and medium static indoor blower factory option sections of the chart. The CFM lines circled in blue apply to the standard static indoor blower factory option. The CFM lines circled in green apply to the medium static indoor blower factory option.



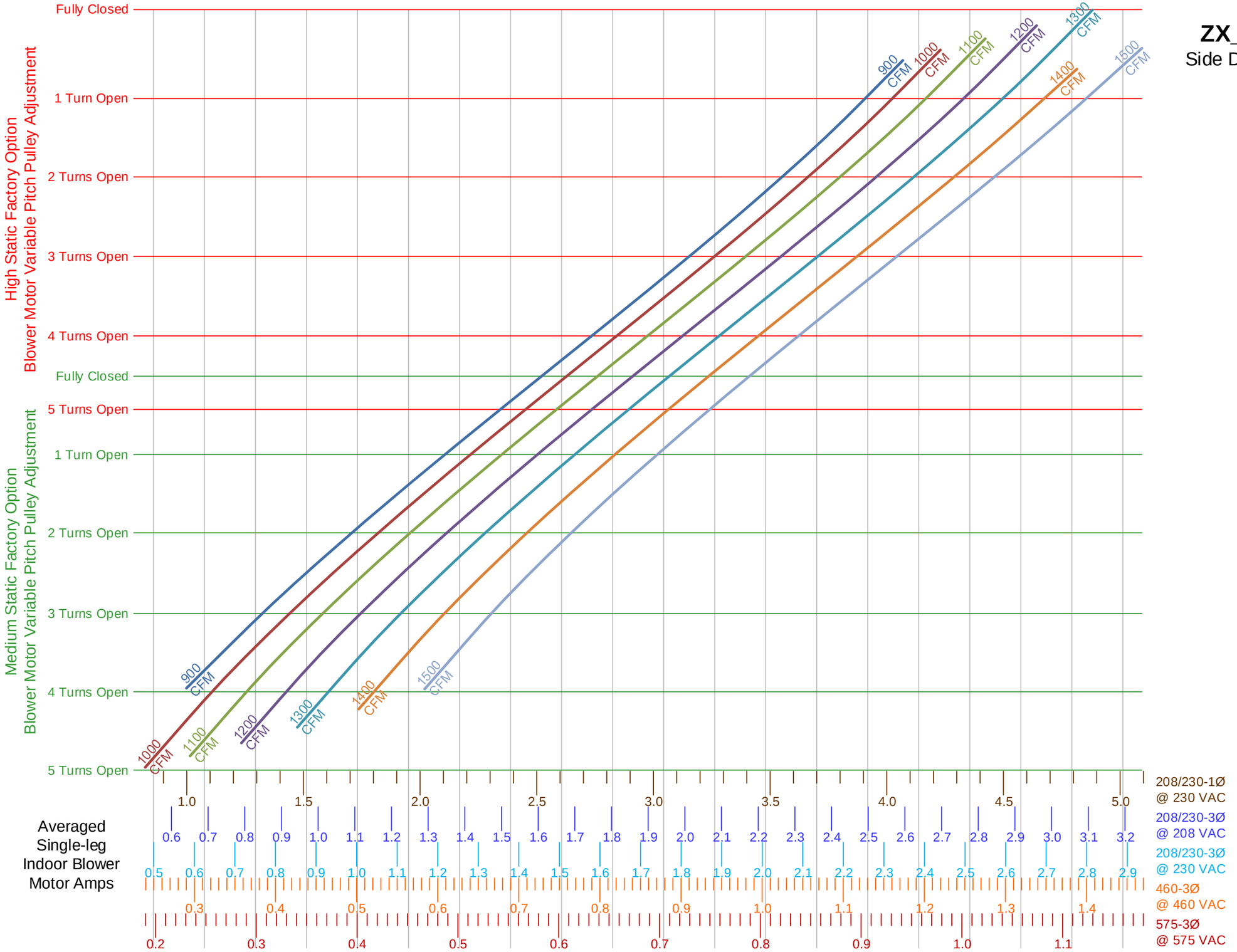
User Guide ZX08 d

The CFM lines are split through the chart when there are efficiency differences in the motors used for the standard, medium and/or high static indoor blower factory options that would cause crossing CFM lines to be drawn in the chart. With split CFM lines, the lines in the horizontal standard, medium and/or high static indoor blower factory option section of the chart apply to that specific static option.

In the example illustration above, the CFM lines are split between the horizontal standard/medium and high static indoor blower factory option sections of the chart. The CFM lines circled in red apply to the high static indoor blower factory option.

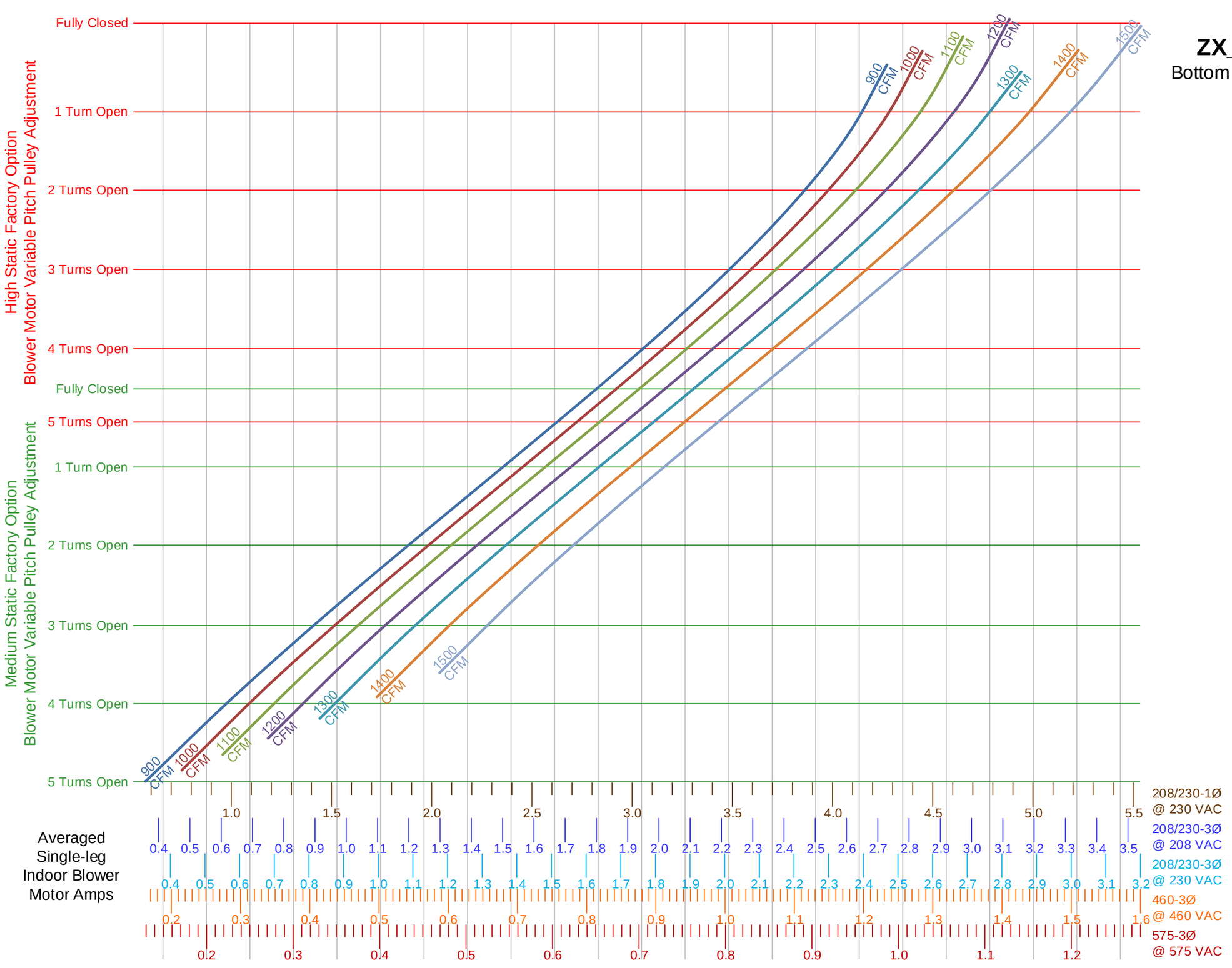
ZX_04 (3 ton)

Side Duct Connection



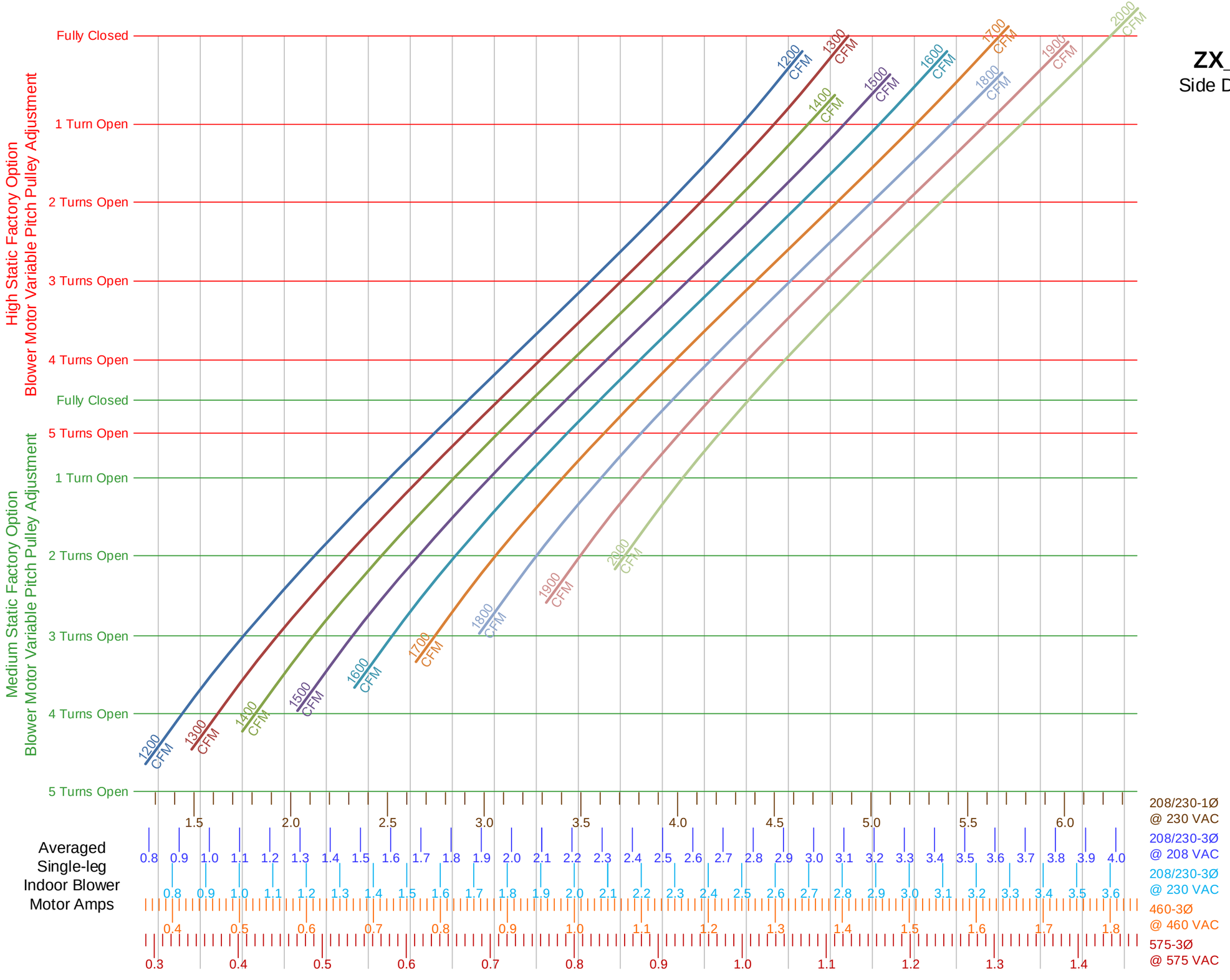
ZX_04 (3 ton)

Bottom Duct Connection



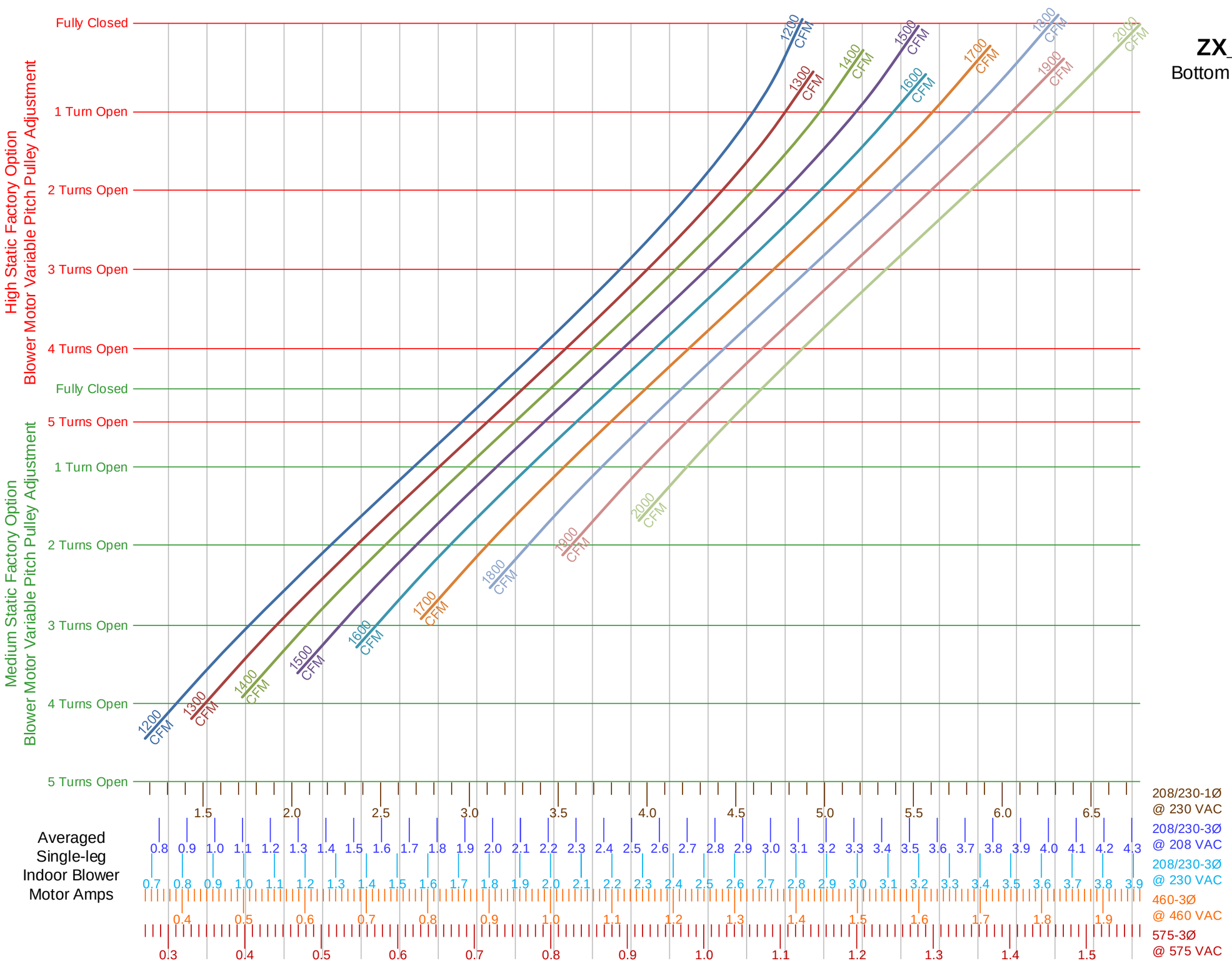
ZX_05 (4 ton)

Side Duct Connection



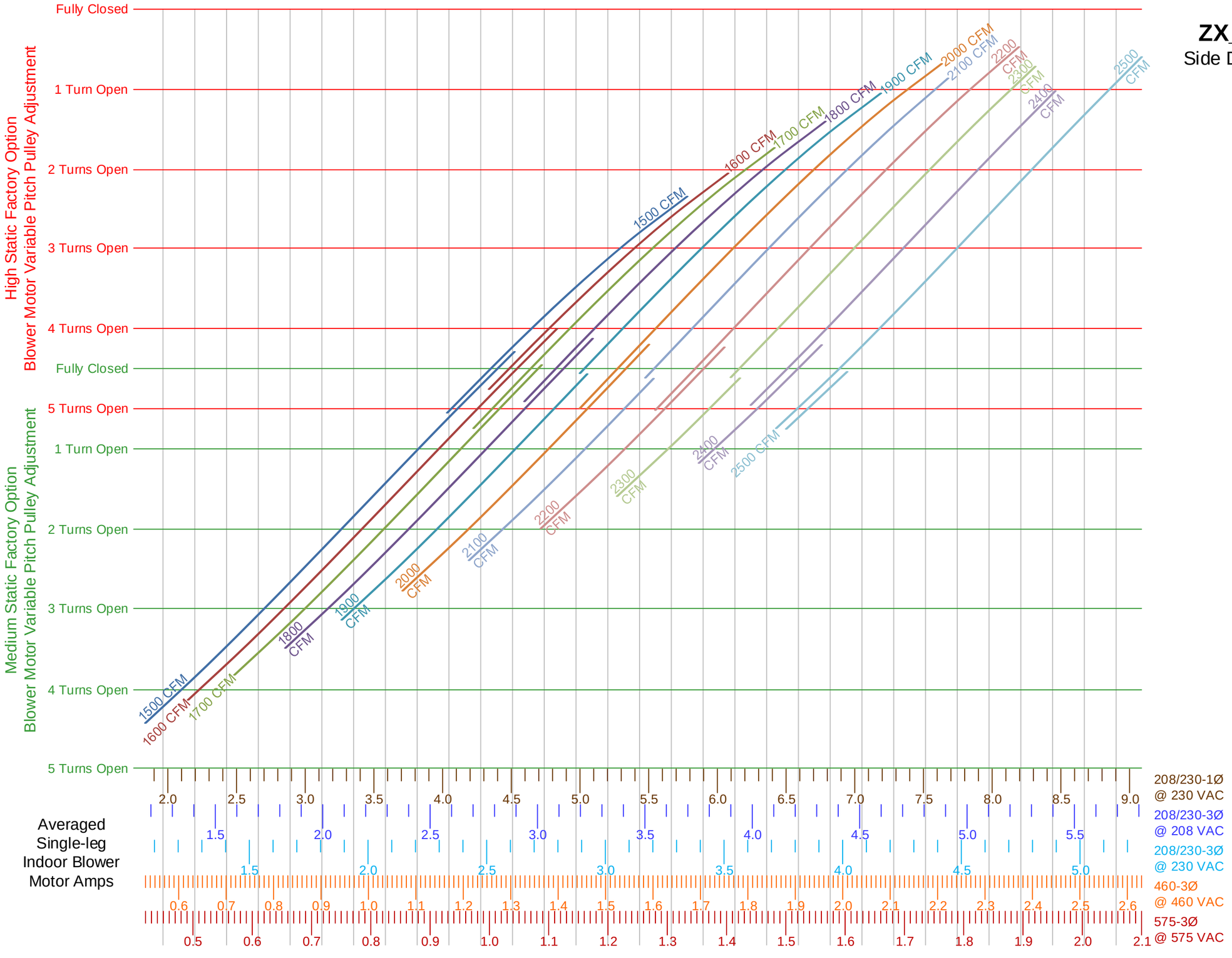
ZX_05 (4 ton)

Bottom Duct Connection



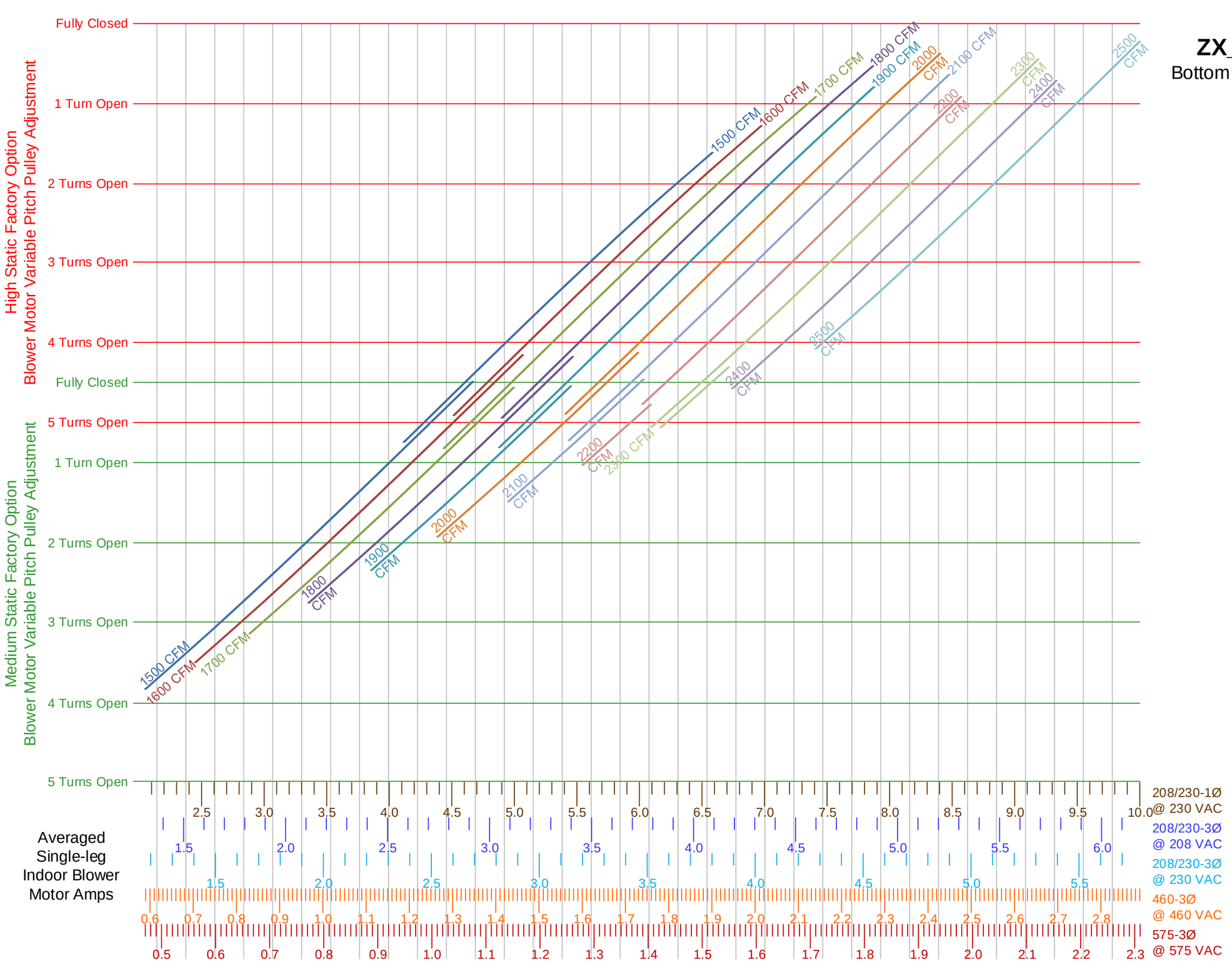
ZX_06 (5 ton)

Side Duct Connection



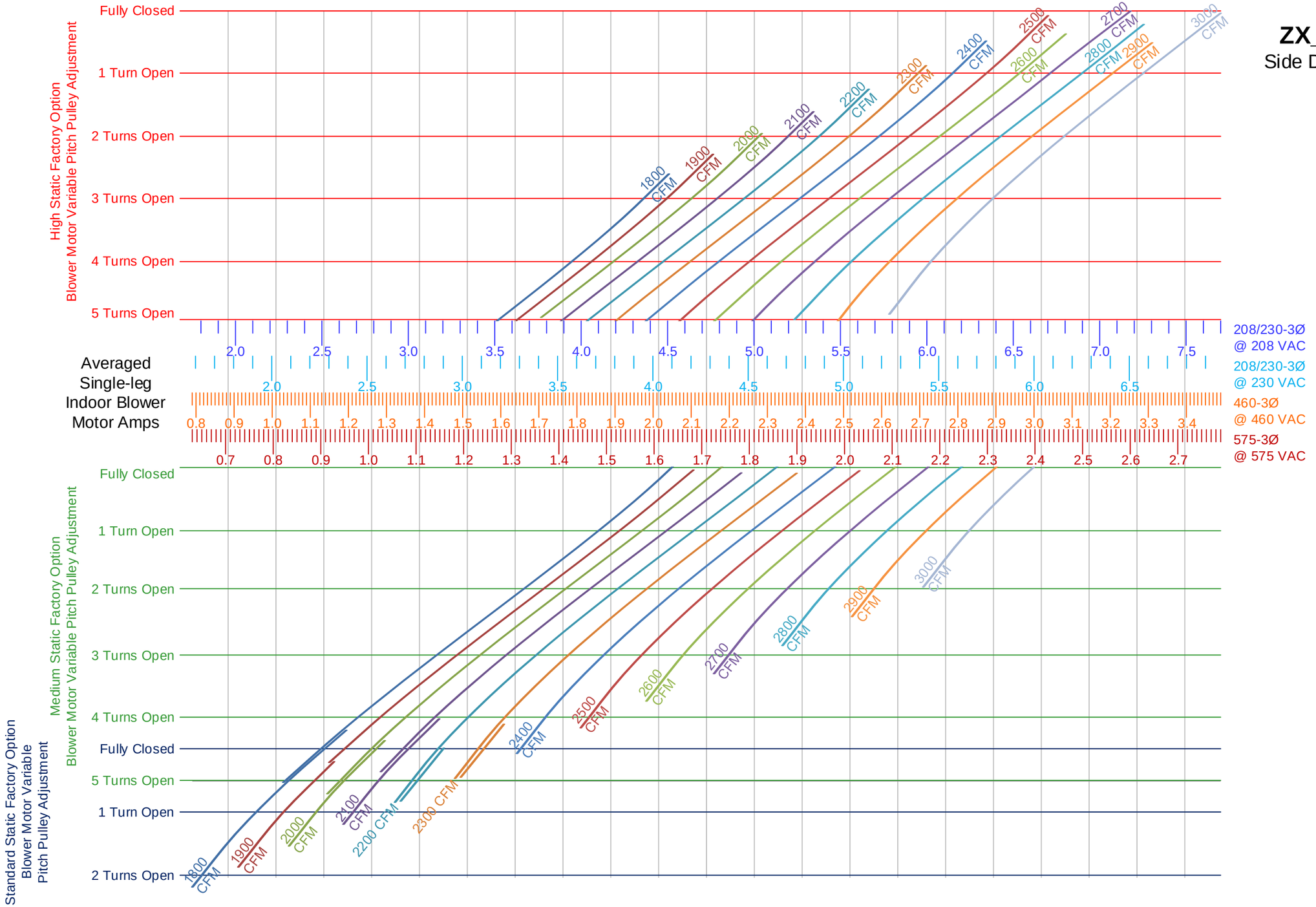
ZX_06 (5 ton)

Bottom Duct Connection



ZX_07 (6 ton)

Side Duct Connection



ZX_07 (6 ton)

Bottom Duct Connection

High Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

Fully Closed
1 Turn Open
2 Turns Open
3 Turns Open
4 Turns Open
5 Turns Open

1800 CFM
1900 CFM
2000 CFM
2100 CFM
2200 CFM
2300 CFM
2400 CFM
2500 CFM
2600 CFM
2700 CFM
2800 CFM
2900 CFM
3000 CFM

Averaged
Single-leg
Indoor Blower
Motor Amps

208/230-3Ø
@ 208 VAC
208/230-3Ø
@ 230 VAC
460-3Ø
@ 460 VAC
575-3Ø
@ 575 VAC

Medium Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

Fully Closed
1 Turn Open
2 Turns Open
3 Turns Open
4 Turns Open
5 Turns Open

1800 CFM
1900 CFM
2000 CFM
2100 CFM
2200 CFM
2300 CFM
2400 CFM
2500 CFM
2600 CFM
2700 CFM
2800 CFM
2900 CFM
3000 CFM

Standard Static Factory Option
Blower Motor Variable
Pitch Pulley Adjustment

Fully Closed
1 Turn Open
2 Turns Open

1800 CFM
1900 CFM
2000 CFM
2100 CFM
2200 CFM
2300 CFM
2400 CFM
2500 CFM
2600 CFM
2700 CFM
2800 CFM
2900 CFM
3000 CFM

ZX_08 (7-½ ton)

Side Duct Connection

High Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

Fully Closed
1 Turn Open
2 Turns Open
3 Turns Open
4 Turns Open
5 Turns Open

2250 CFM
2400 CFM
2600 CFM
2800 CFM
3000 CFM
3200 CFM
3400 CFM
3600 CFM
3750 CFM

Averaged Single-leg Indoor Blower Motor Amps

208/230-3Ø @ 208 VAC
208/230-3Ø @ 230 VAC
460-3Ø @ 460 VAC
575-3Ø @ 575 VAC

Medium Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

Fully Closed
1 Turn Open
2 Turns Open
3 Turns Open
4 Turns Open

Standard Static Factory Option
Blower Motor Variable
Pitch Pulley Adjustment

Fully Closed
5 Turns Open
1 Turn Open
2 Turns Open
3 Turns Open

2250 CFM
2400 CFM
2600 CFM
2800 CFM
3000 CFM
3200 CFM
3400 CFM
3600 CFM
3750 CFM

ZX_08 (7-½ ton)

Bottom Duct Connection

High Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

Fully Closed
1 Turn Open
2 Turns Open
3 Turns Open
4 Turns Open
5 Turns Open

2250 CFM
2400 CFM
2600 CFM
2800 CFM
3000 CFM
3200 CFM
3400 CFM
3600 CFM
3750 CFM

Averaged Single-leg Indoor Blower Motor Amps

208/230-3Ø @ 208 VAC
208/230-3Ø @ 230 VAC
460-3Ø @ 460 VAC
575-3Ø @ 575 VAC

Medium Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

Fully Closed
1 Turn Open
2 Turns Open
3 Turns Open
4 Turns Open

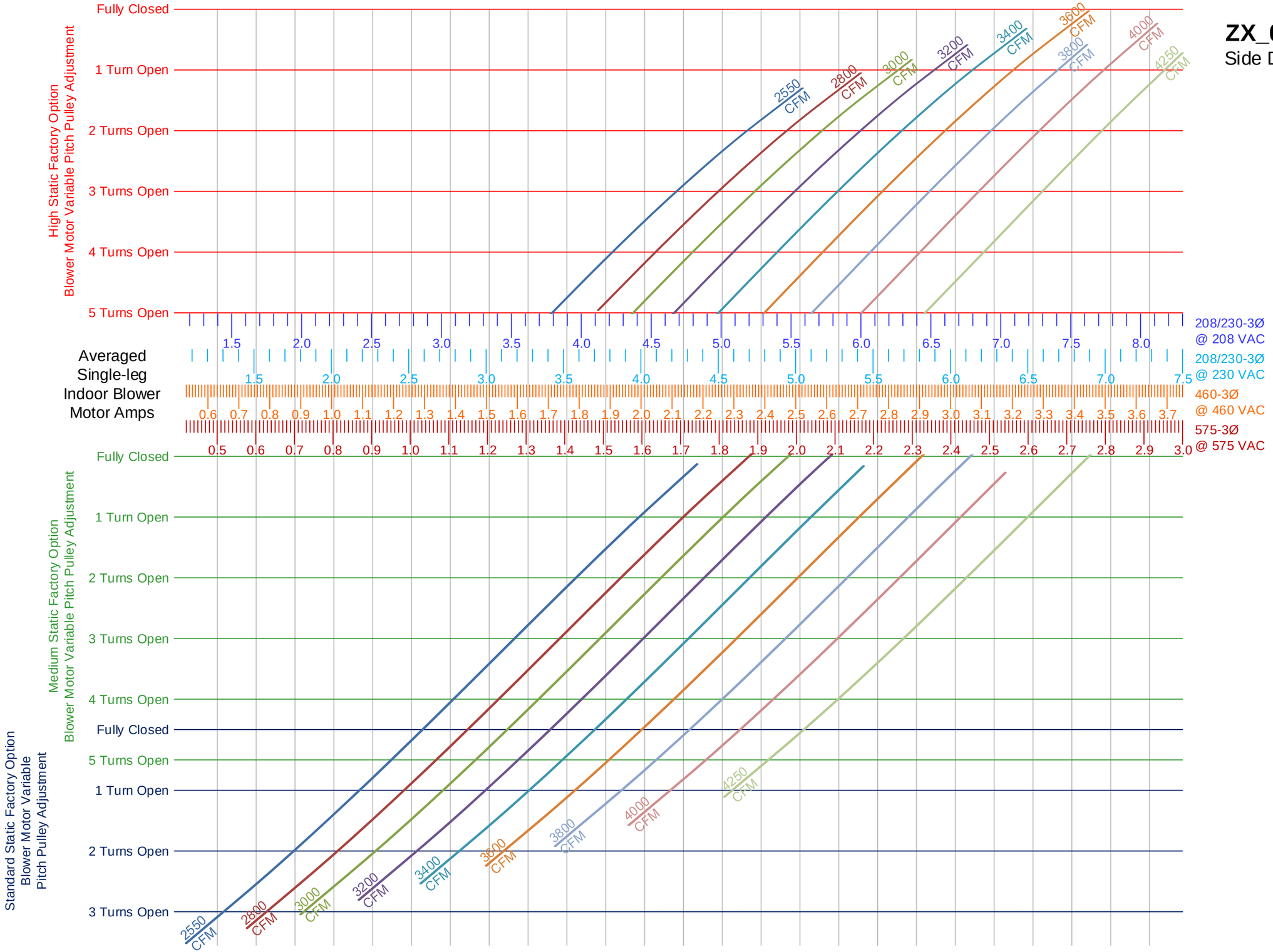
Standard Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

Fully Closed
5 Turns Open
1 Turn Open
2 Turns Open
3 Turns Open

2250 CFM
2400 CFM
2600 CFM
2800 CFM
3000 CFM
3200 CFM
3400 CFM
3600 CFM
3750 CFM

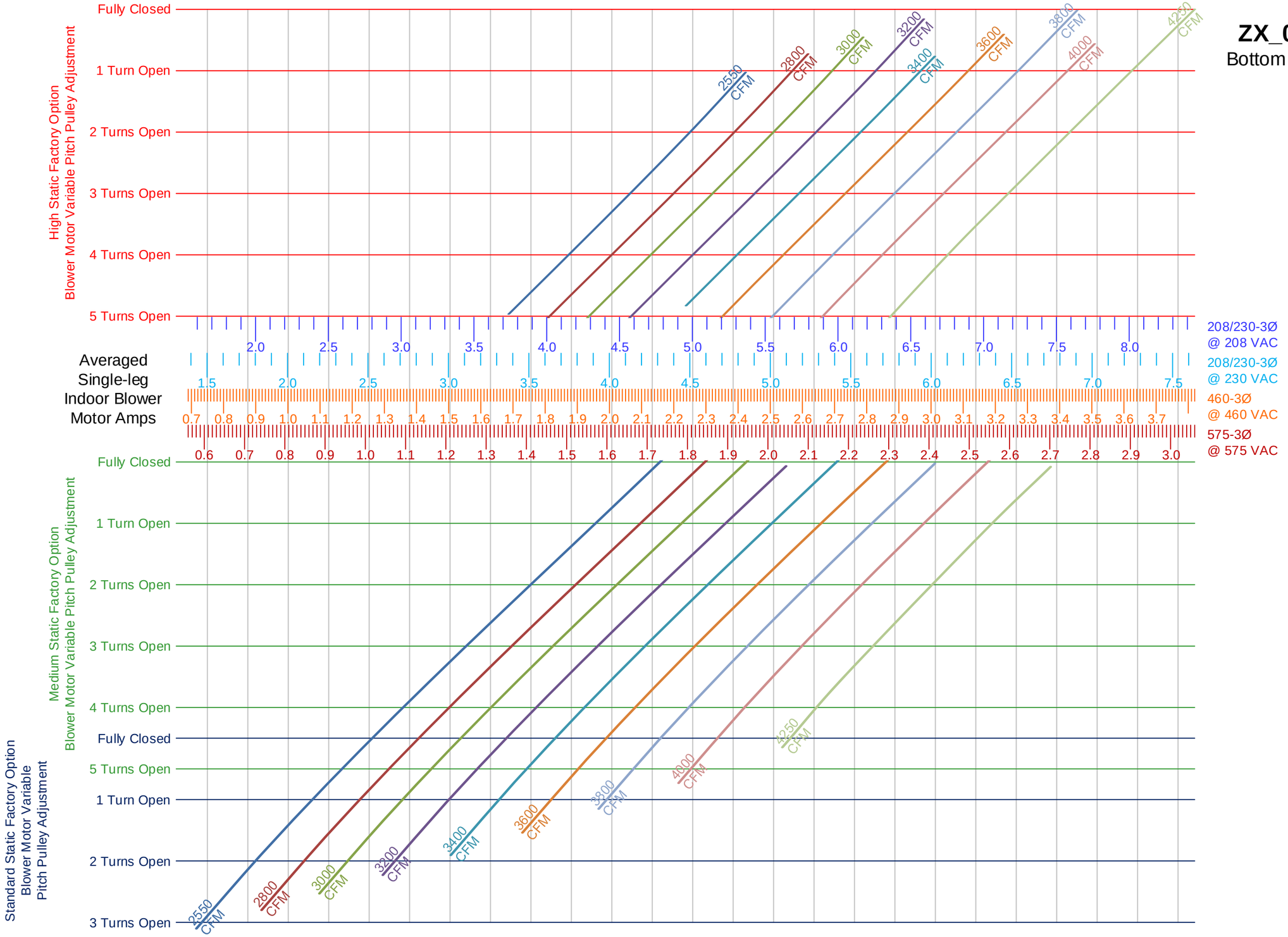
ZX_09 (8-½ ton)

Side Duct Connection



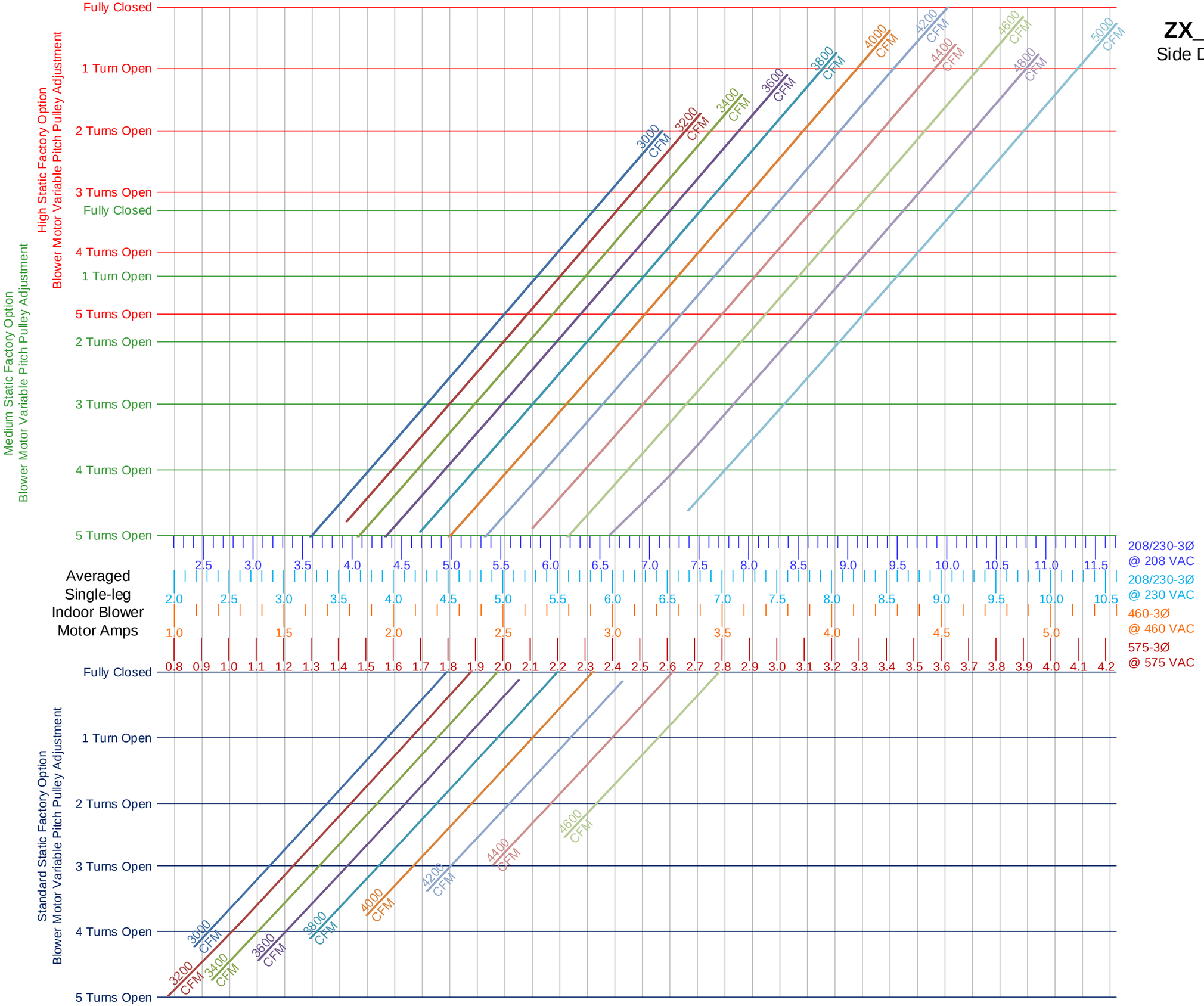
ZX_09 (8-½ ton)

Bottom Duct Connection



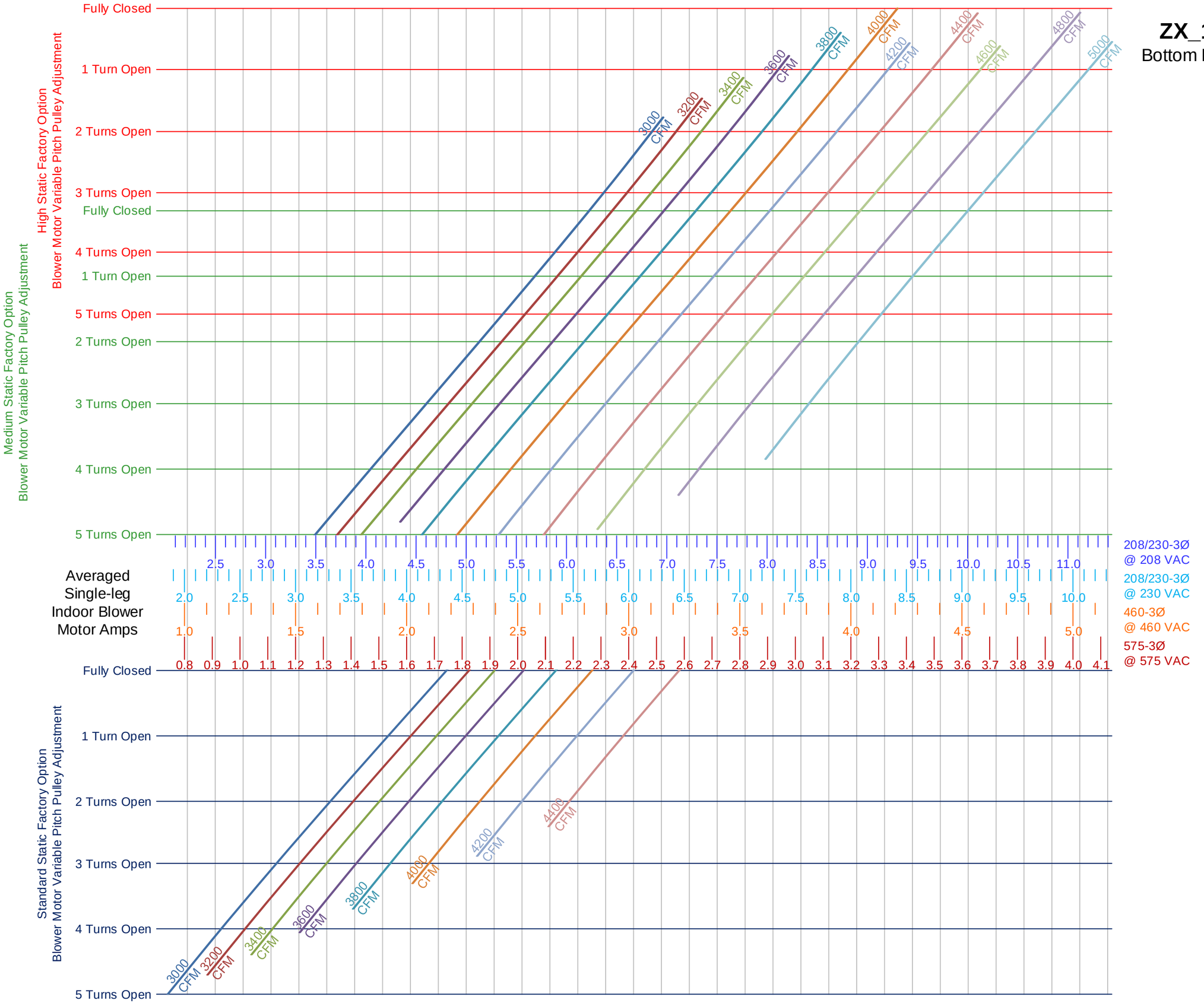
ZX_12 (10 ton)

Side Duct Connection



ZX_12 (10 ton)

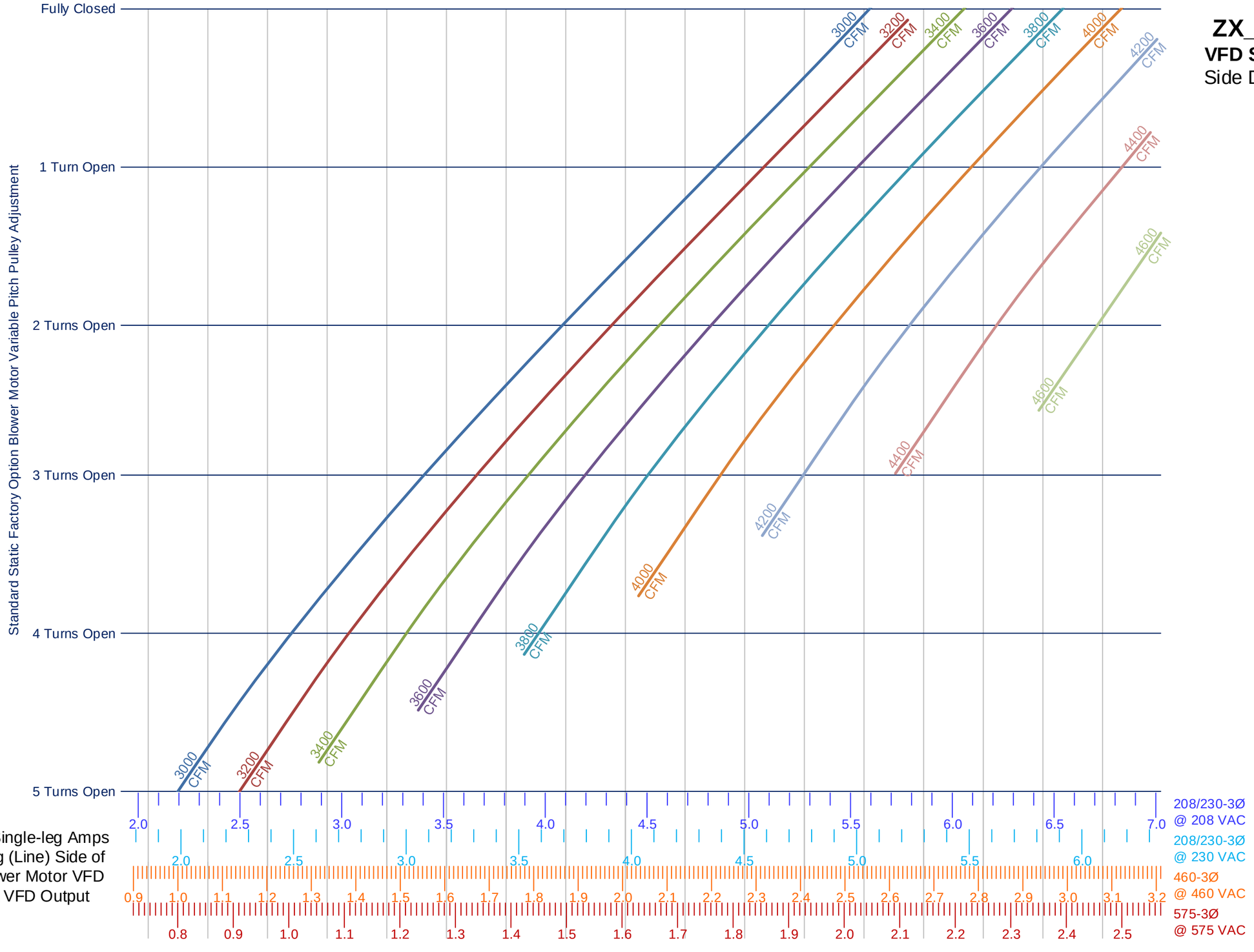
Bottom Duct Connection



ZX_12 (10 ton)

VFD Standard Static

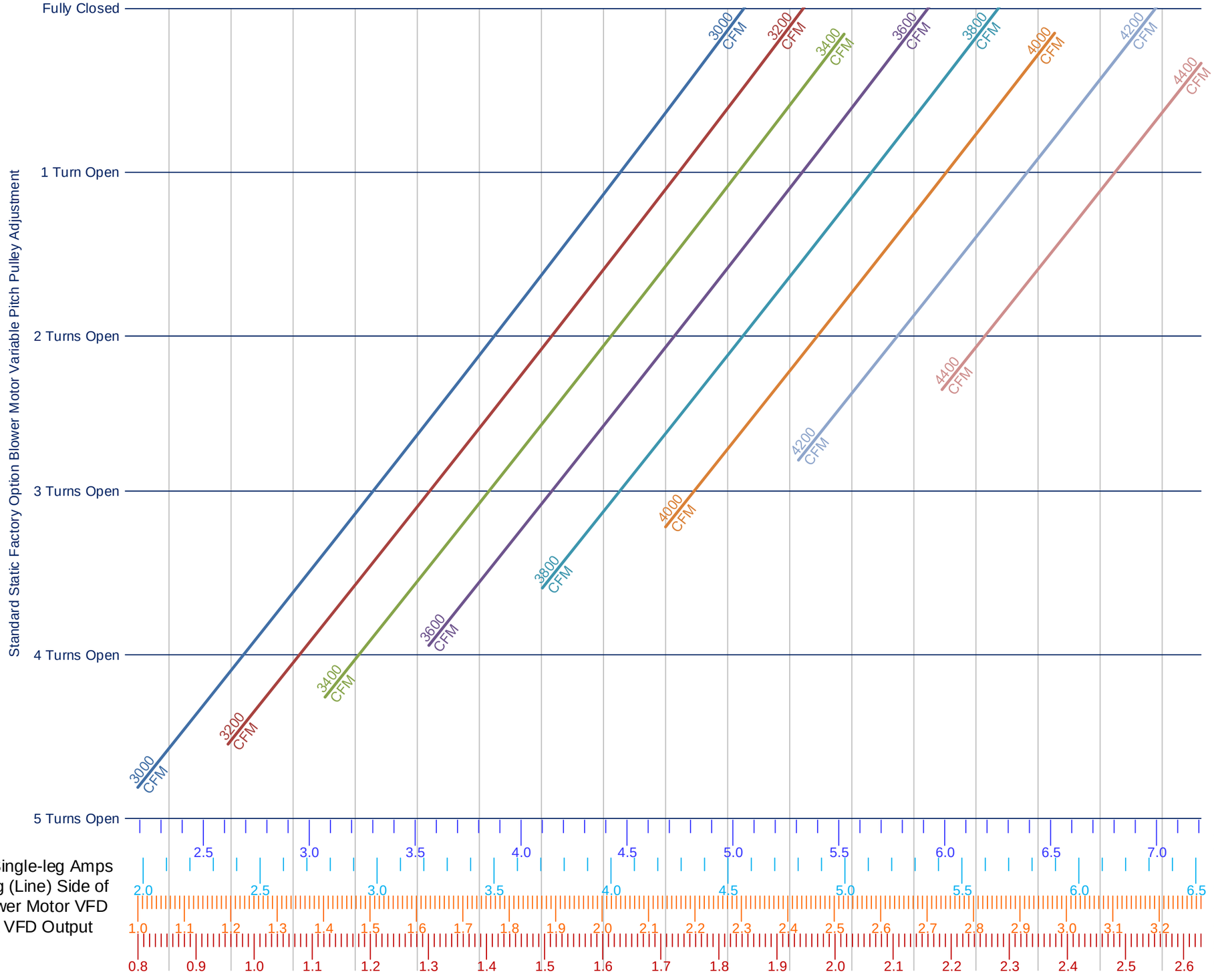
Side Duct Connection



ZX_12 (10 ton)

VFD Standard Static

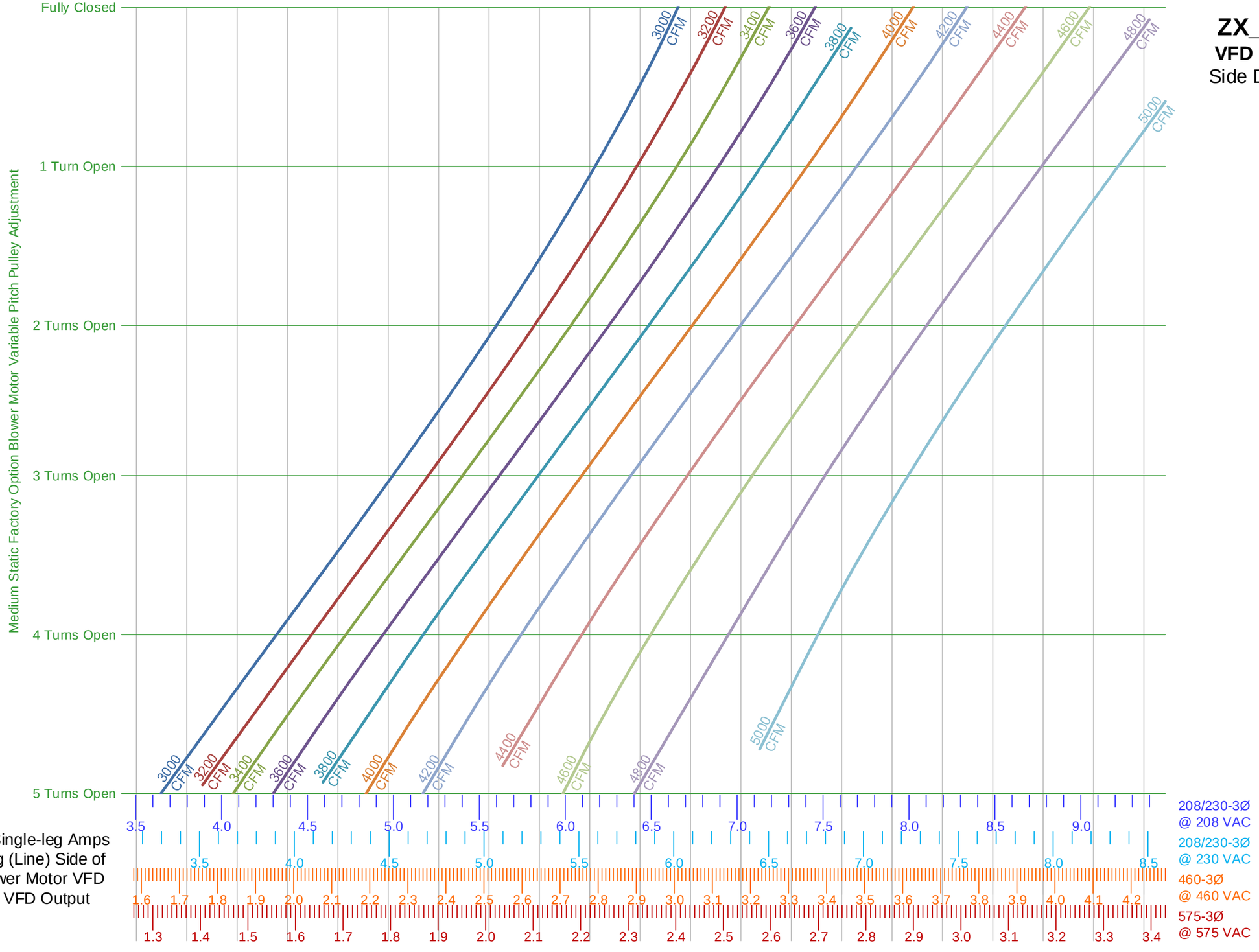
Bottom Duct Connection



ZX_12 (10 ton)

VFD Medium Static

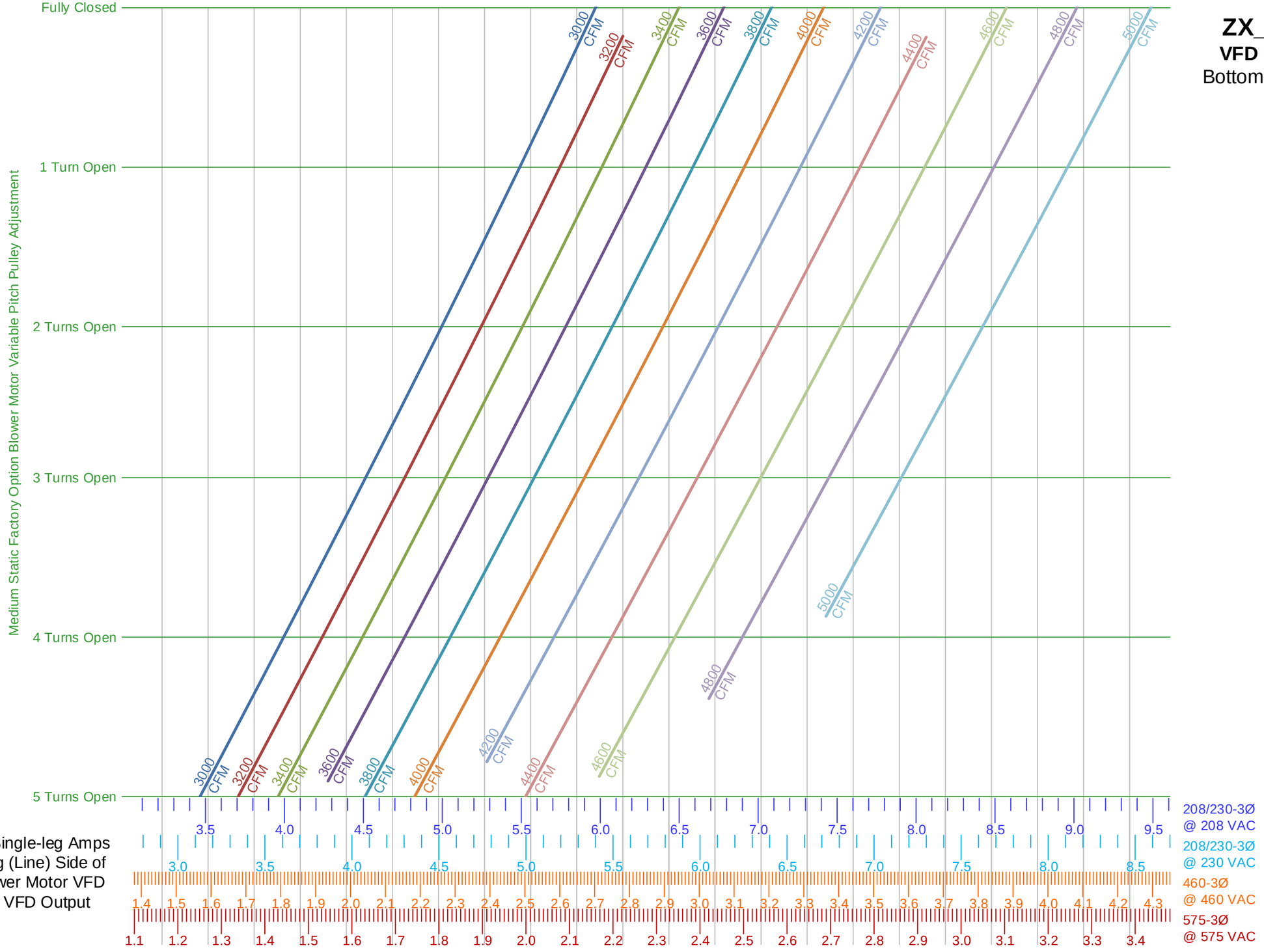
Side Duct Connection



ZX_12 (10 ton)

VFD Medium Static

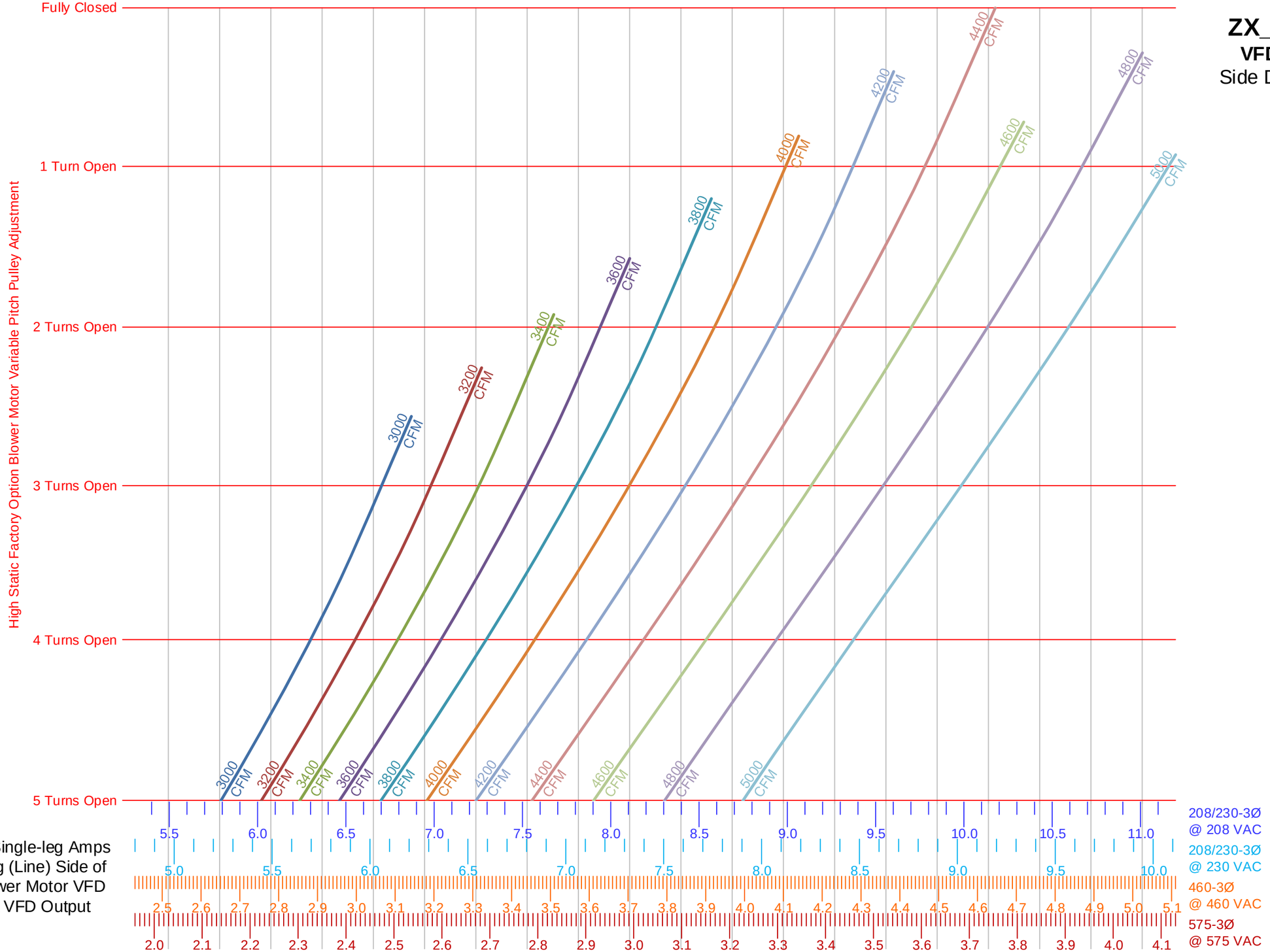
Bottom Duct Connection



ZX_12 (10 ton)

VFD High Static

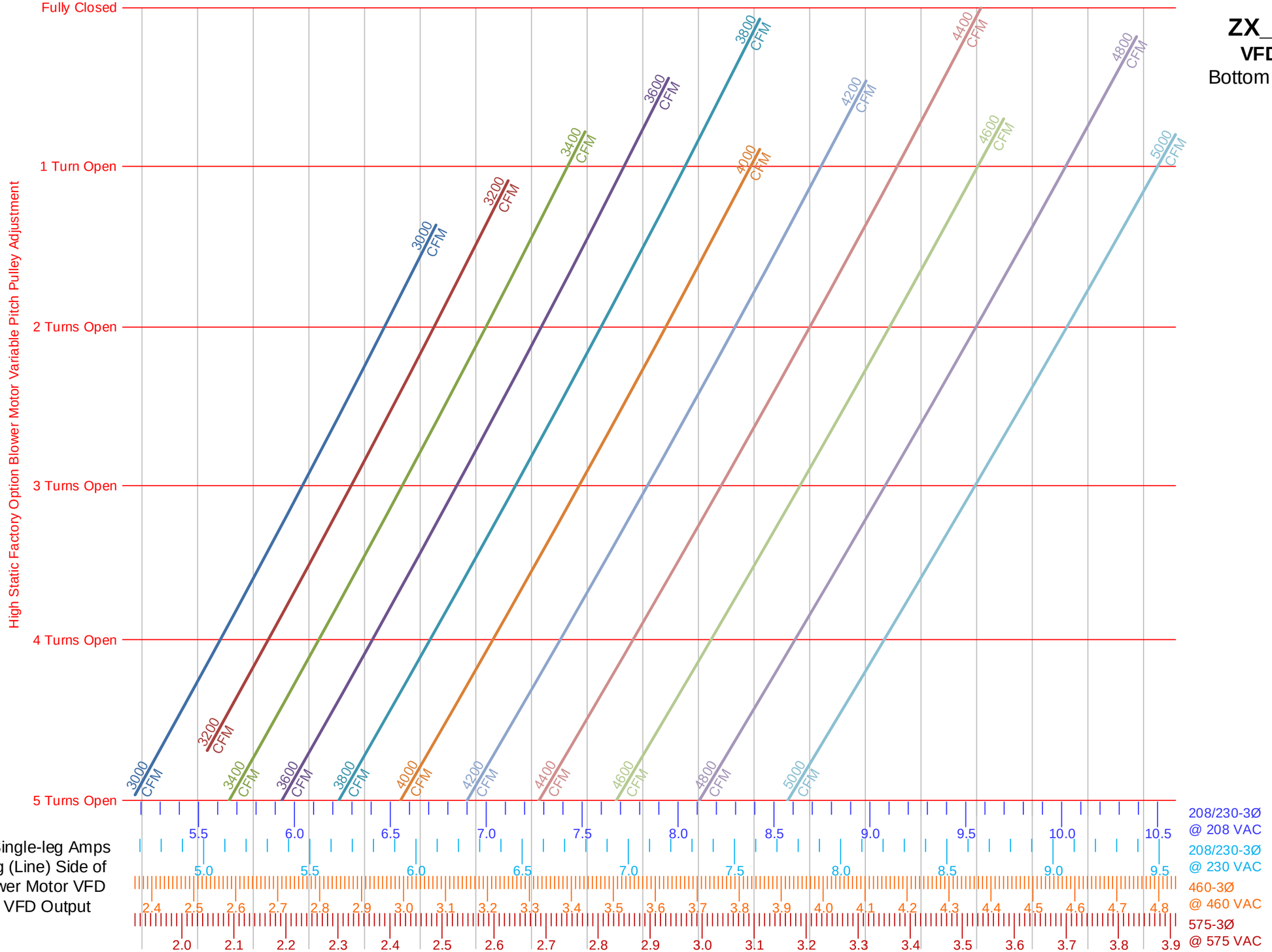
Side Duct Connection



ZX_12 (10 ton)

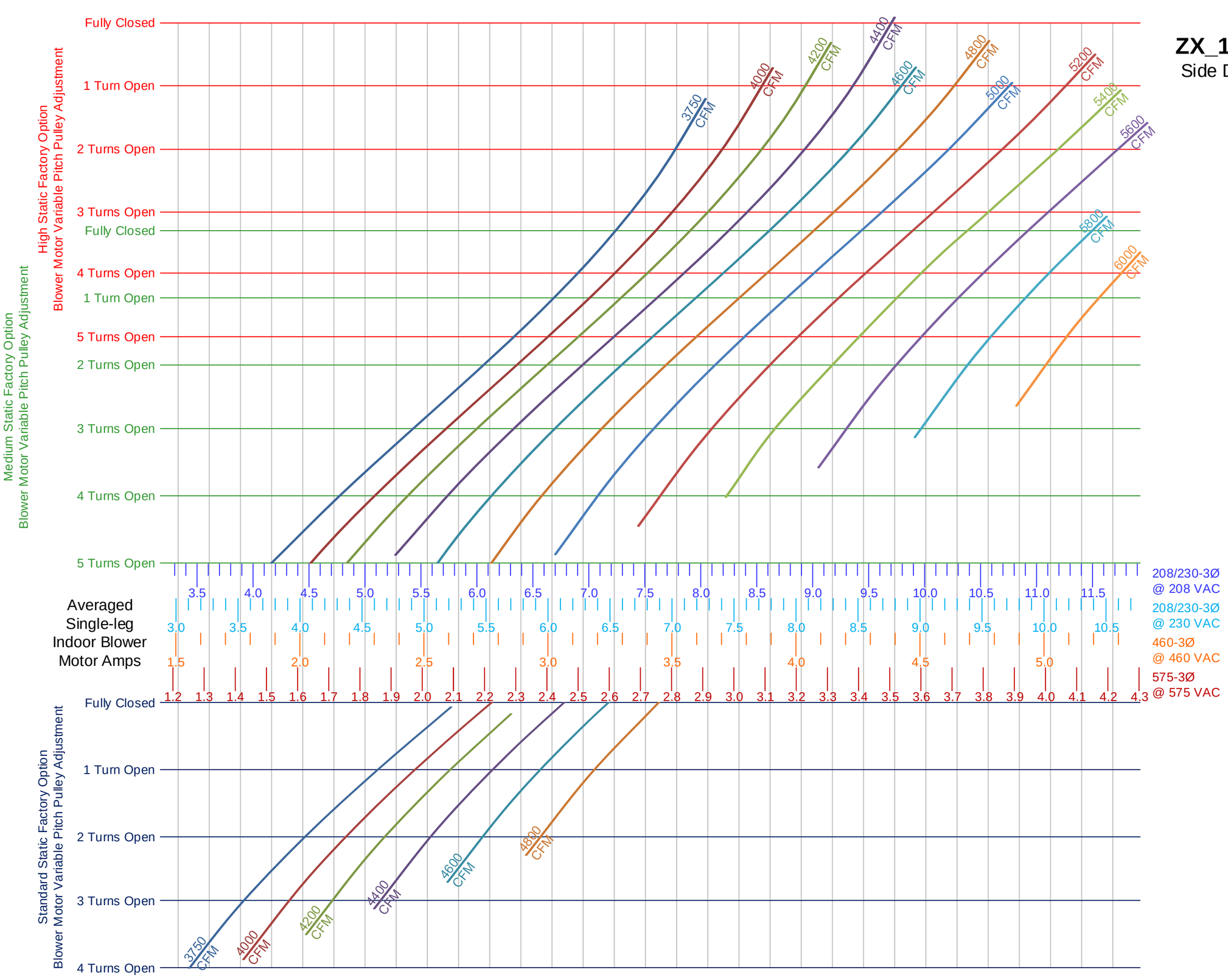
VFD High Static

Bottom Duct Connection



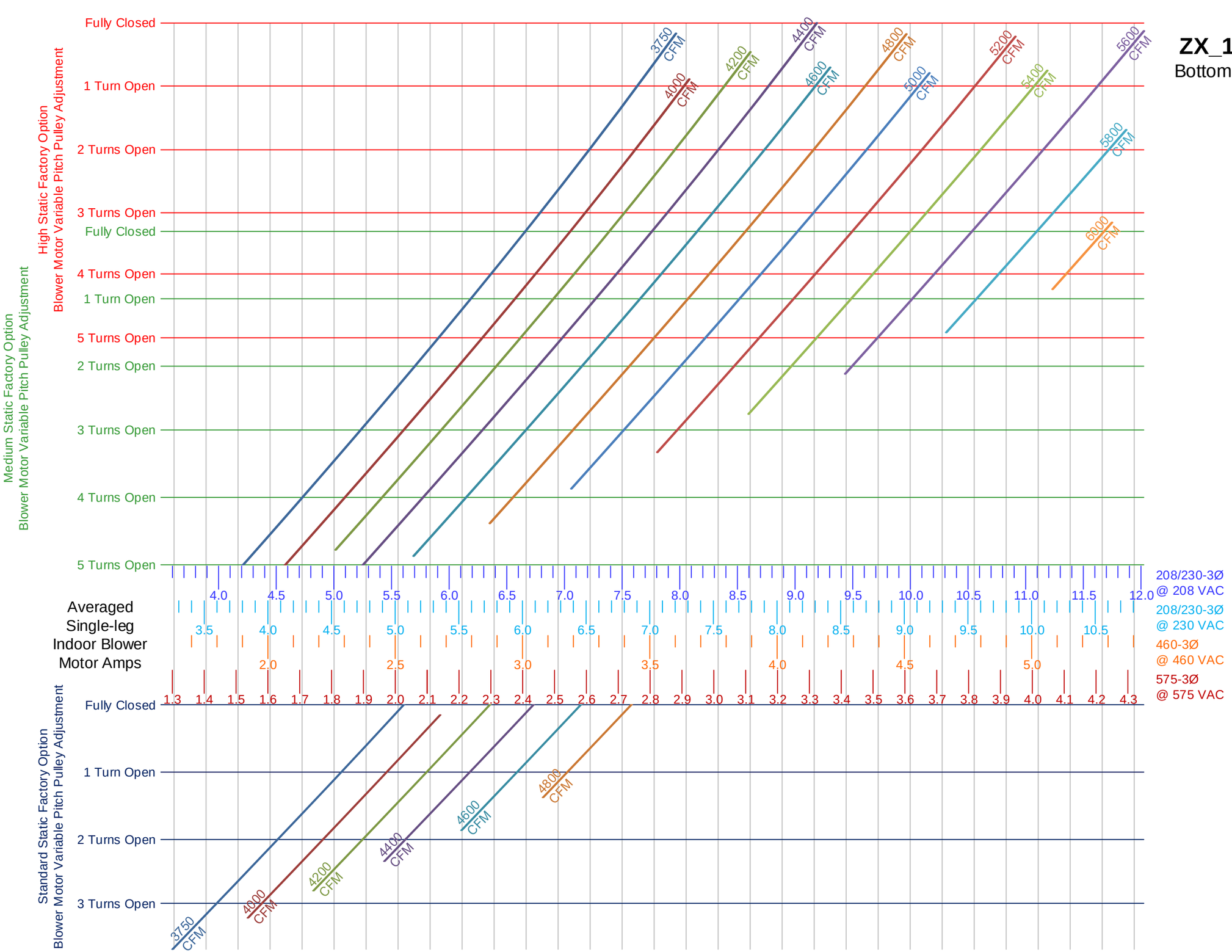
ZX_14 (12-½ ton)

Side Duct Connection



ZX_14 (12-½ ton)

Bottom Duct Connection



ZY_04 (3 ton)
XY_04 (3 ton)
Side Duct Connection

High Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

Fully Closed
1 Turn Open
2 Turns Open
3 Turns Open
4 Turns Open

Medium Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

Fully Closed
5 Turns Open
1 Turn Open
2 Turns Open
3 Turns Open
4 Turns Open
5 Turns Open

900 CFM
1000 CFM
1100 CFM
1200 CFM
1300 CFM
1400 CFM
1500 CFM

Averaged Single-leg Indoor Blower Motor Amps

208/230-1Ø @ 230 VAC: 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

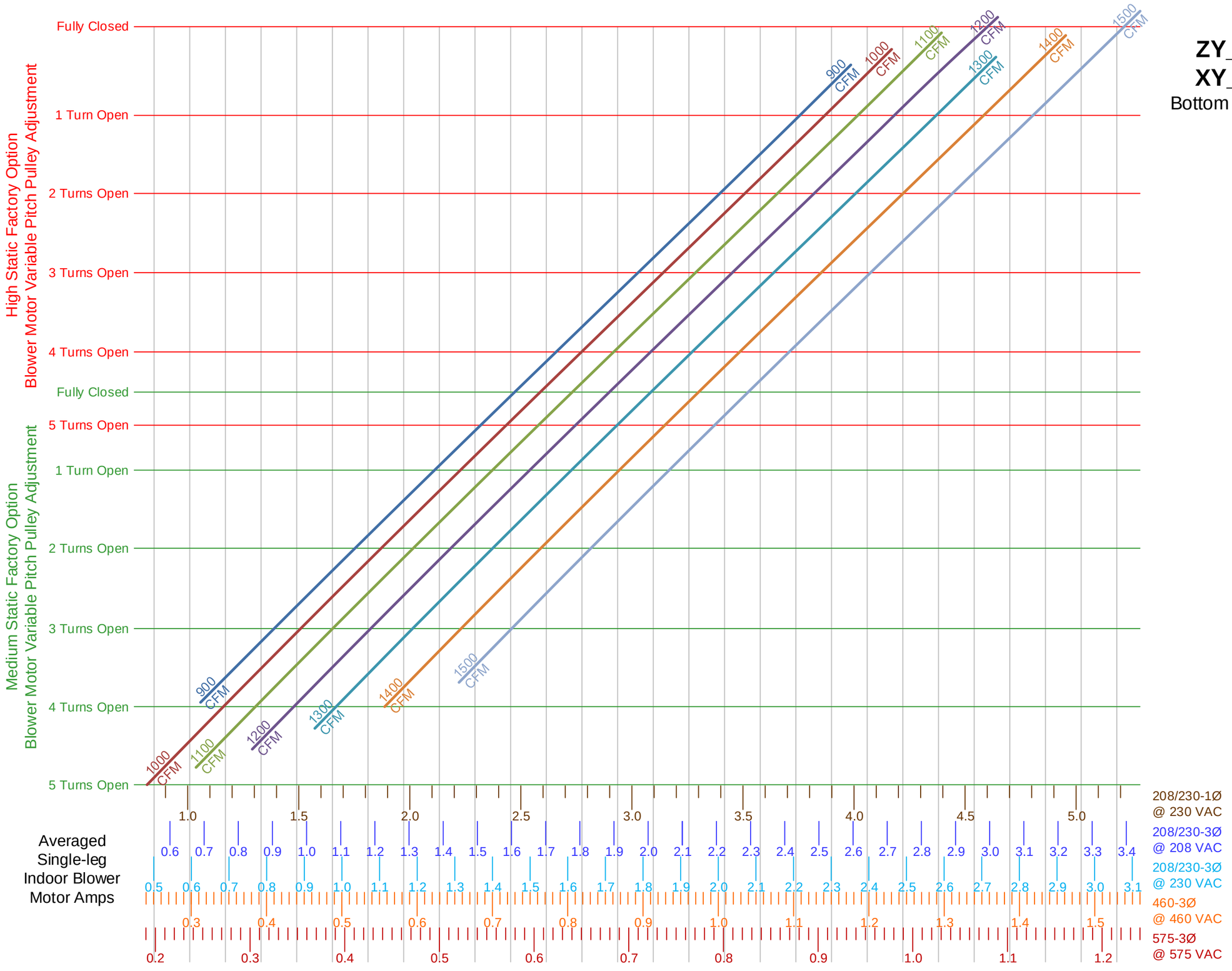
208/230-3Ø @ 208 VAC: 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.0 3.1 3.2 3.3 3.4

208/230-3Ø @ 230 VAC: 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.0 3.1

460-3Ø @ 460 VAC: 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5

575-3Ø @ 575 VAC: 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2

ZY_04 (3 ton)
XY_04 (3 ton)
Bottom Duct Connection



ZY_05 (4 ton)
XY_05 (4 ton)
Side Duct Connection

High Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

Fully Closed
1 Turn Open
2 Turns Open
3 Turns Open
4 Turns Open

Medium Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

Fully Closed
5 Turns Open
1 Turn Open
2 Turns Open
3 Turns Open
4 Turns Open
5 Turns Open

1200 CFM
1300 CFM
1400 CFM
1500 CFM
1600 CFM
1700 CFM
1800 CFM
1900 CFM
2000 CFM

Averaged Single-leg Indoor Blower Motor Amps

208/230-1Ø @ 230 VAC: 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5

208/230-3Ø @ 208 VAC: 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.0 3.1 3.2 3.3 3.4 3.5 3.6 3.7 3.8 3.9 4.0 4.1 4.2

208/230-3Ø @ 230 VAC: 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.0 3.1 3.2 3.3 3.4 3.5 3.6 3.7 3.8

460-3Ø @ 460 VAC: 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9

575-3Ø @ 575 VAC: 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5

ZY_05 (4 ton)
XY_05 (4 ton)
Bottom Duct Connection

High Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

Fully Closed
1 Turn Open
2 Turns Open
3 Turns Open
4 Turns Open

Medium Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

Fully Closed
5 Turns Open
1 Turn Open
2 Turns Open
3 Turns Open
4 Turns Open
5 Turns Open

1200 CFM
1300 CFM
1400 CFM
1500 CFM
1600 CFM
1700 CFM
1800 CFM
1900 CFM
2000 CFM

Averaged Single-leg Indoor Blower Motor Amps

1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5

208/230-1Ø @ 230 VAC: 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.0 3.1 3.2 3.3 3.4 3.5 3.6 3.7 3.8 3.9 4.0 4.1 4.2

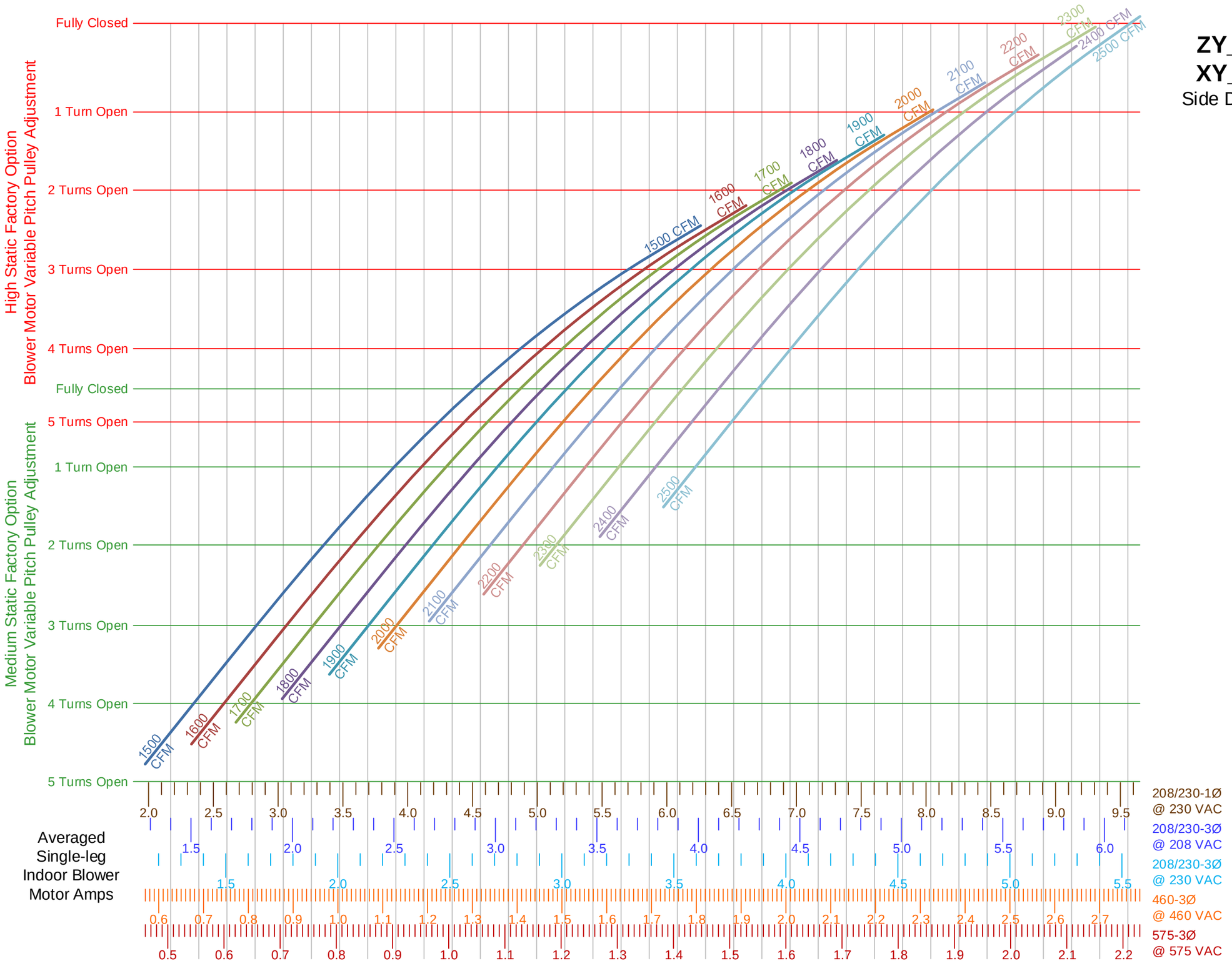
208/230-3Ø @ 208 VAC: 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.0 3.1 3.2 3.3 3.4 3.5 3.6 3.7 3.8

208/230-3Ø @ 230 VAC: 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9

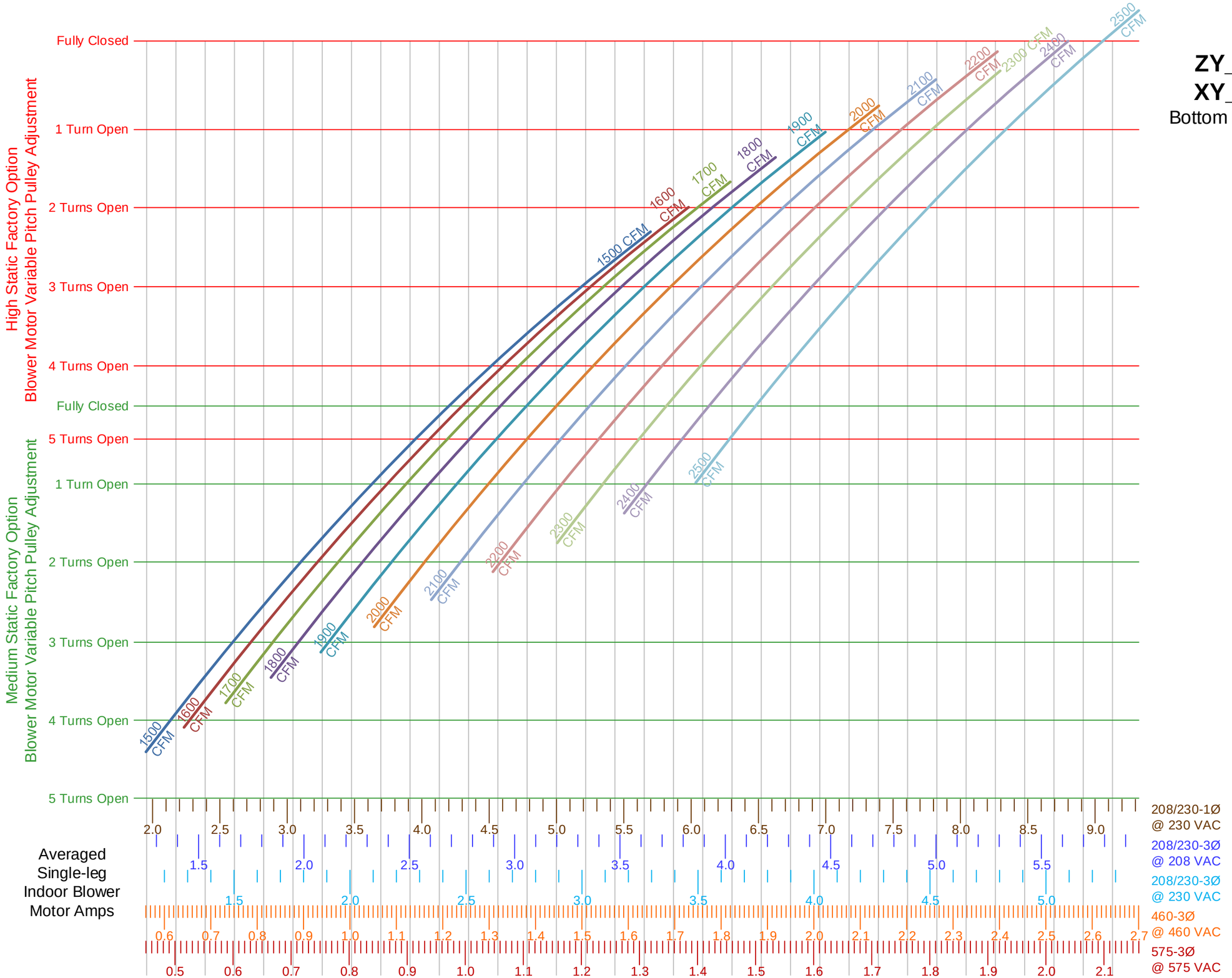
460-3Ø @ 460 VAC: 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5

575-3Ø @ 575 VAC

ZY_06 (5 ton)
XY_06 (5 ton)
Side Duct Connection



ZY_06 (5 ton)
XY_06 (5 ton)
Bottom Duct Connection



ZY_07 (6 ton)

Side Duct Connection

High Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

Fully Closed
1 Turn Open
2 Turns Open
3 Turns Open
4 Turns Open
5 Turns Open

1800CFM
1900
2000
2100 CFM
2200
2300
2400 CFM
2500 CFM
2600 CFM
2700 CFM
2800 CFM
2900 CFM
3000 CFM

Averaged
Single-leg
Indoor Blower
Motor Amps

208/230-3Ø
@ 208 VAC
208/230-3Ø
@ 230 VAC
460-3Ø
@ 460 VAC
575-3Ø
@ 575 VAC

Medium Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

Standard Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

ZY_07 (6 ton)

Bottom Duct Connection

High Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

Fully Closed
1 Turn Open
2 Turns Open
3 Turns Open
4 Turns Open
5 Turns Open

1800CFM 1900 2000 2100 2200 2300 2400 2500 CFM 2600 CFM 2700 CFM 2800 CFM 2900 CFM 3000 CFM

Averaged Single-leg Indoor Blower Motor Amps

208/230-3Ø @ 208 VAC: 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0

208/230-3Ø @ 230 VAC: 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5

460-3Ø @ 460 VAC: 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7

575-3Ø @ 575 VAC: 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2

Medium Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

Fully Closed
1 Turn Open
2 Turns Open
3 Turns Open
4 Turns Open

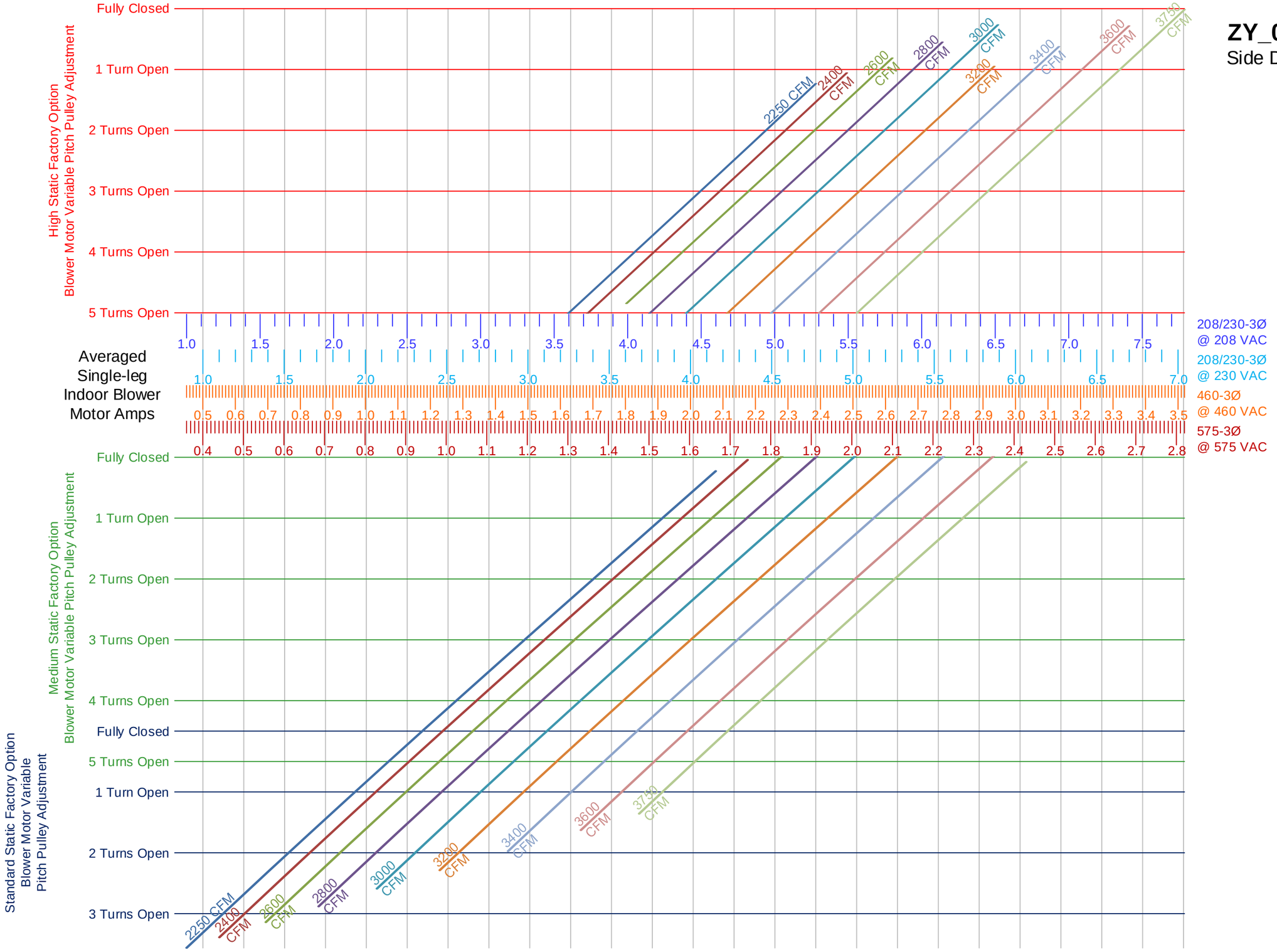
Standard Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

Fully Closed
1 Turn Open
2 Turns Open
3 Turns Open
4 Turns Open
5 Turns Open

1800CFM 1900 2000 2100 2200 2300 2400 2500 CFM 2600 CFM 2700 CFM 2800 CFM 2900 CFM 3000 CFM

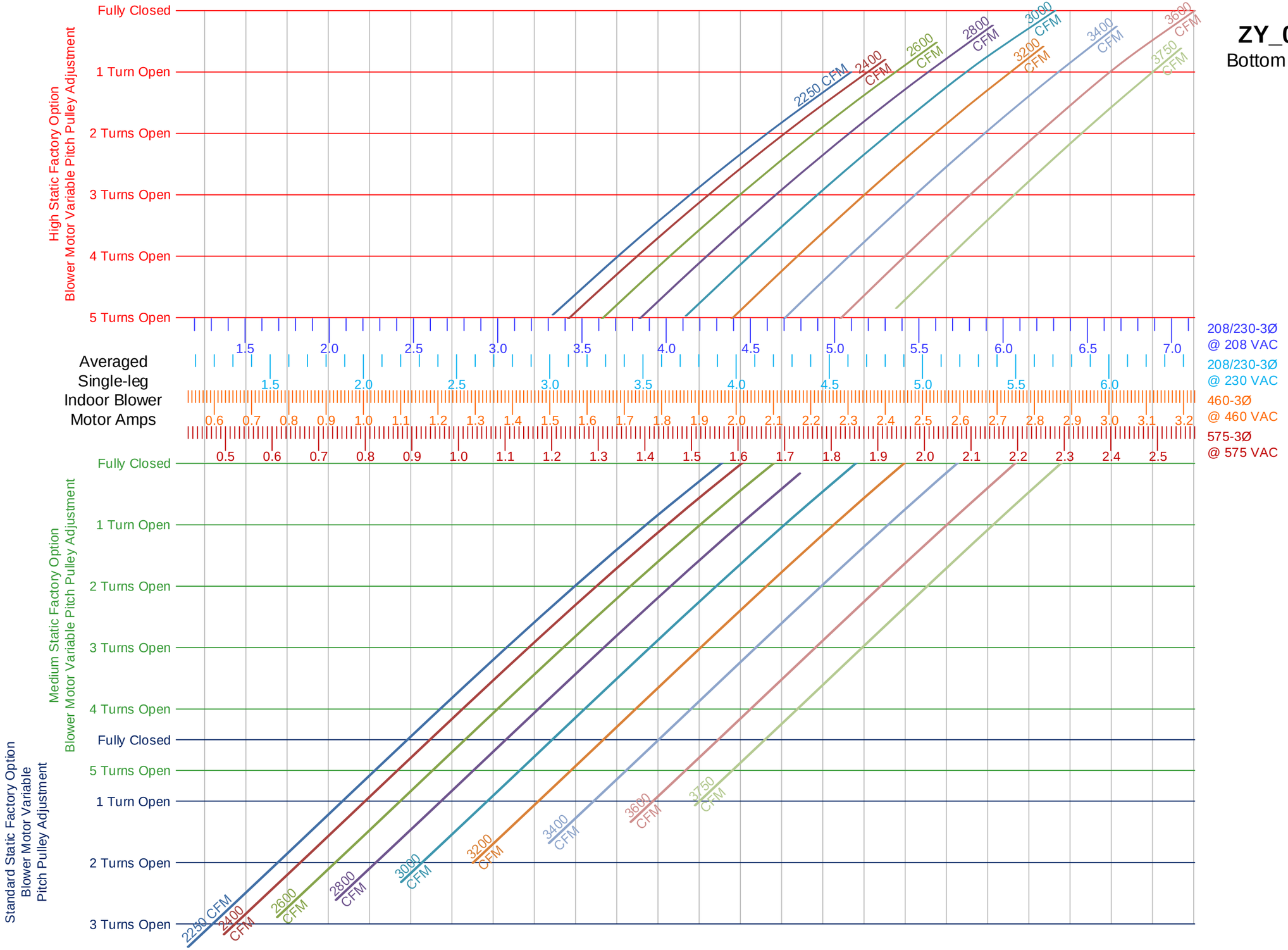
ZY_08 (7-½ ton)

Side Duct Connection



ZY_08 (7-½ ton)

Bottom Duct Connection



ZY_09 (8-½ ton)

Side Duct Connection

High Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

Fully Closed
1 Turn Open
2 Turns Open
3 Turns Open
4 Turns Open
5 Turns Open

2550 CFM
2800 CFM
3000 CFM
3200 CFM
3400 CFM
3600 CFM
3800 CFM
4000 CFM
4250 CFM

Averaged Single-leg Indoor Blower Motor Amps

208/230-3Ø @ 208 VAC
208/230-3Ø @ 230 VAC
460-3Ø @ 460 VAC
575-3Ø @ 575 VAC

Medium Static Factory Option
Blower Motor Variable Pitch Pulley Adjustment

Fully Closed
1 Turn Open
2 Turns Open
3 Turns Open
4 Turns Open
5 Turns Open

2550 CFM
2800 CFM
3000 CFM
3200 CFM
3400 CFM
3600 CFM
3800 CFM
4000 CFM
4250 CFM

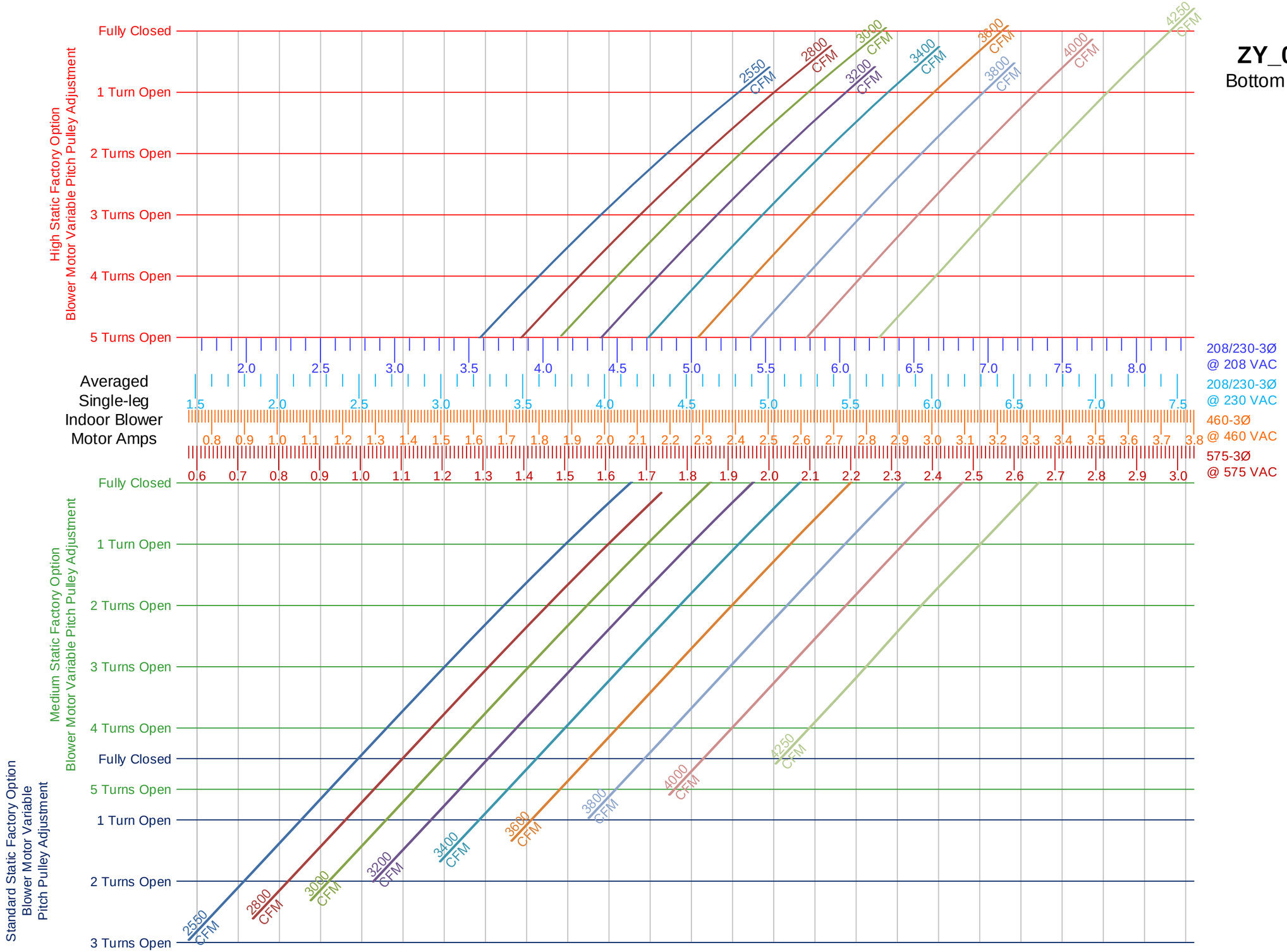
Standard Static Factory Option
Blower Motor Variable
Pitch Pulley Adjustment

Fully Closed
1 Turn Open
2 Turns Open
3 Turns Open

2550 CFM
2800 CFM
3000 CFM
3200 CFM
3400 CFM
3600 CFM
3800 CFM
4000 CFM
4250 CFM

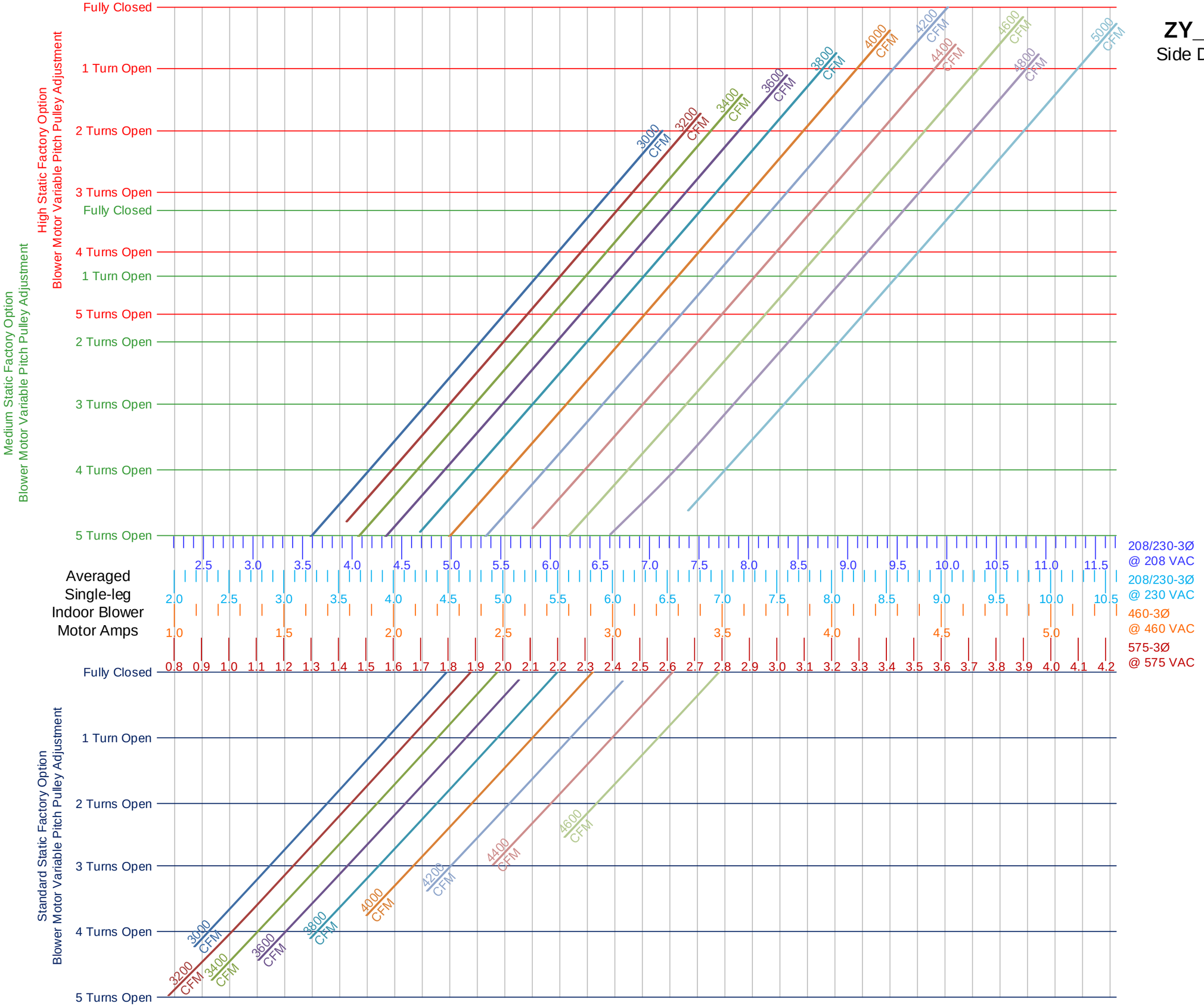
ZY_09 (8-½ ton)

Bottom Duct Connection



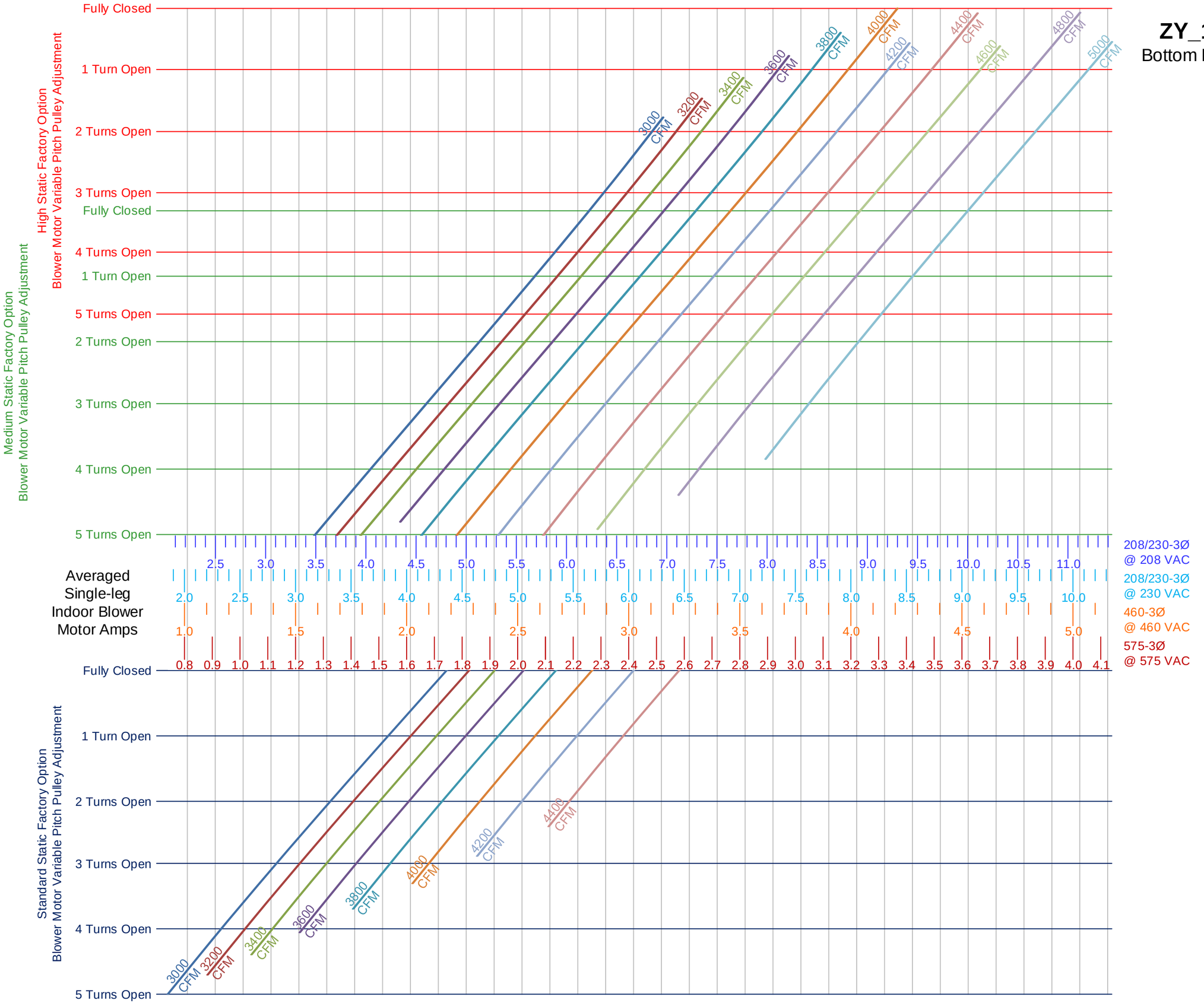
ZY_12 (10 ton)

Side Duct Connection



ZY_12 (10 ton)

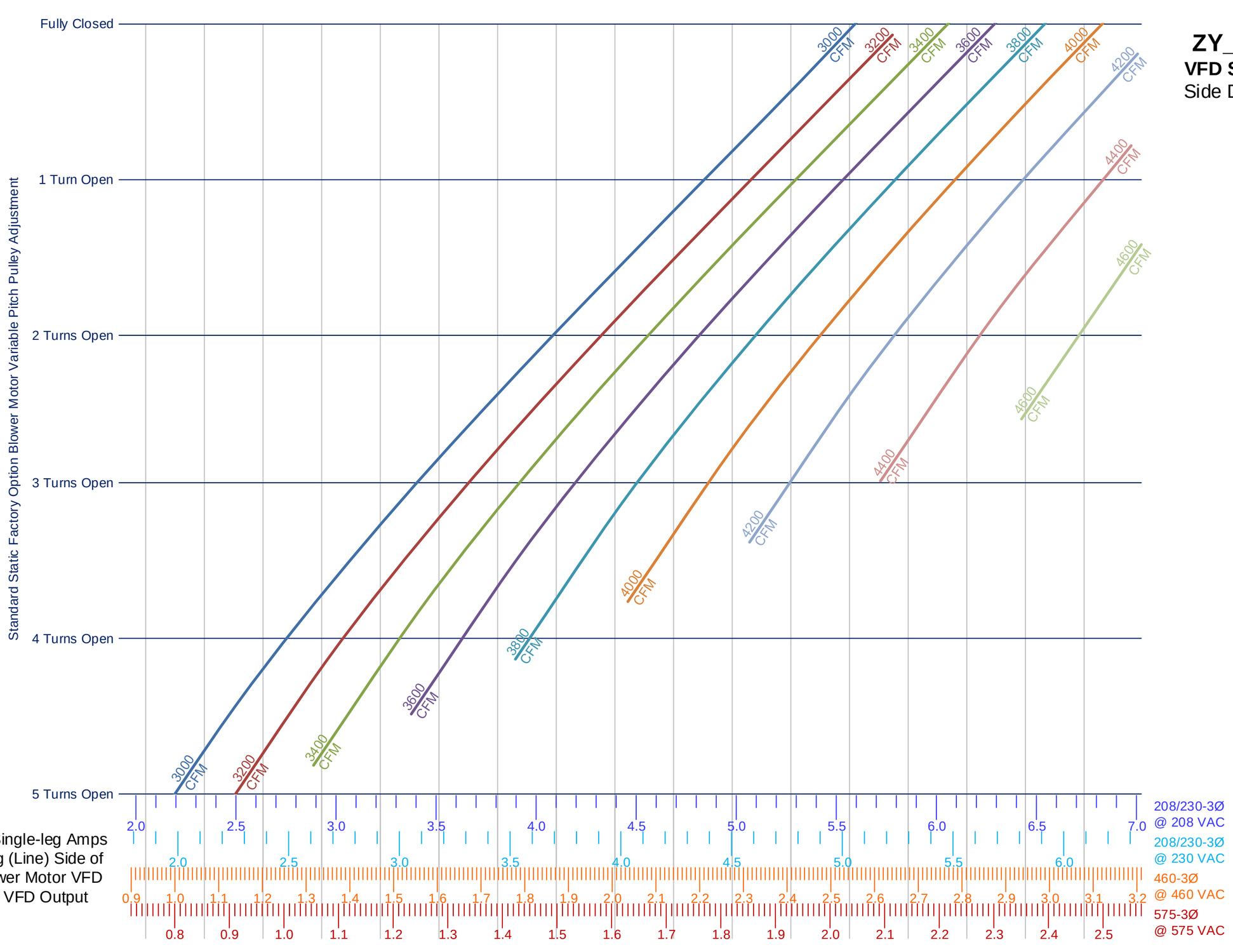
Bottom Duct Connection



ZY_12 (10 ton)

VFD Standard Static

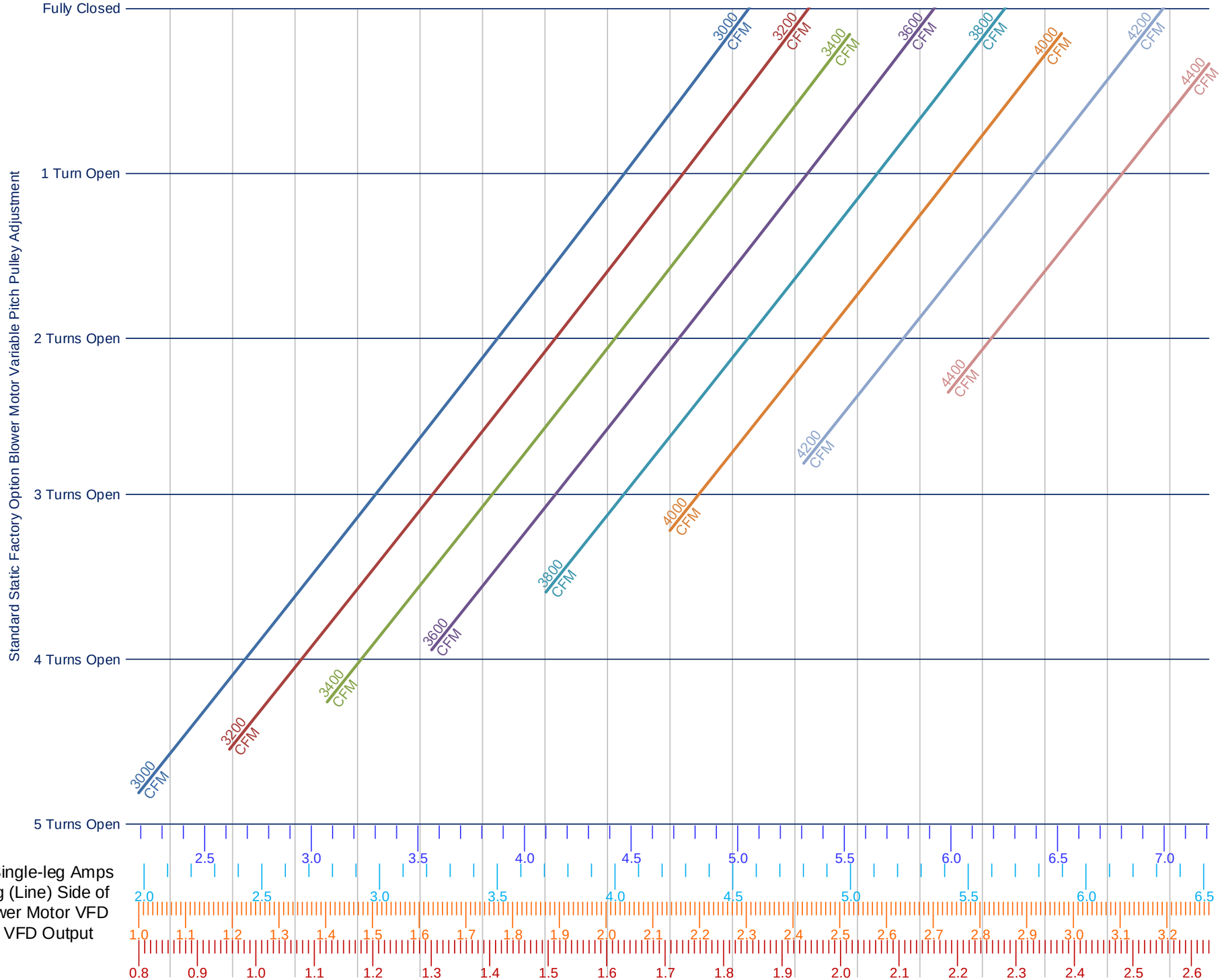
Side Duct Connection



ZY_12 (10 ton)

VFD Standard Static

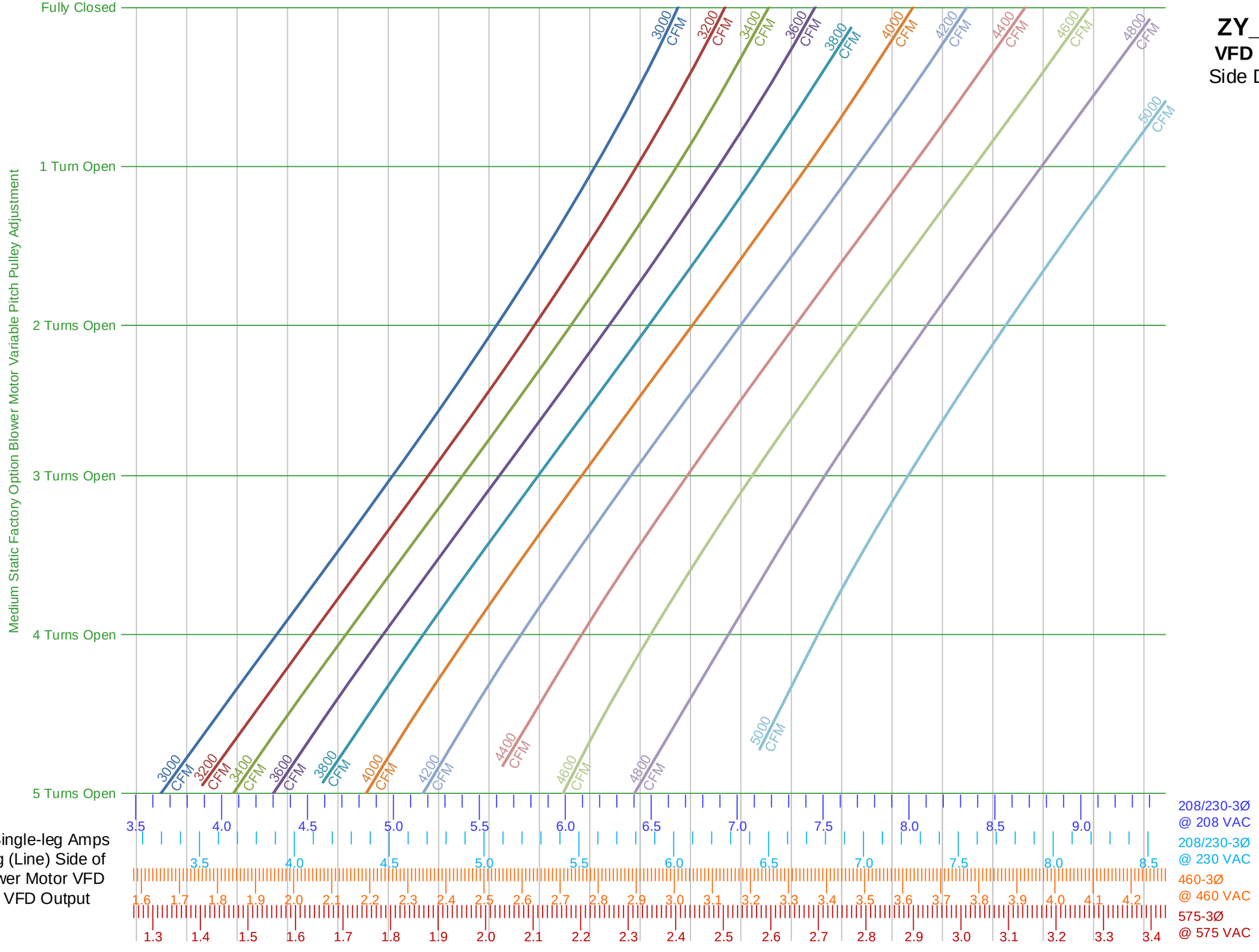
Bottom Duct Connection



ZY_12 (10 ton)

VFD Medium Static

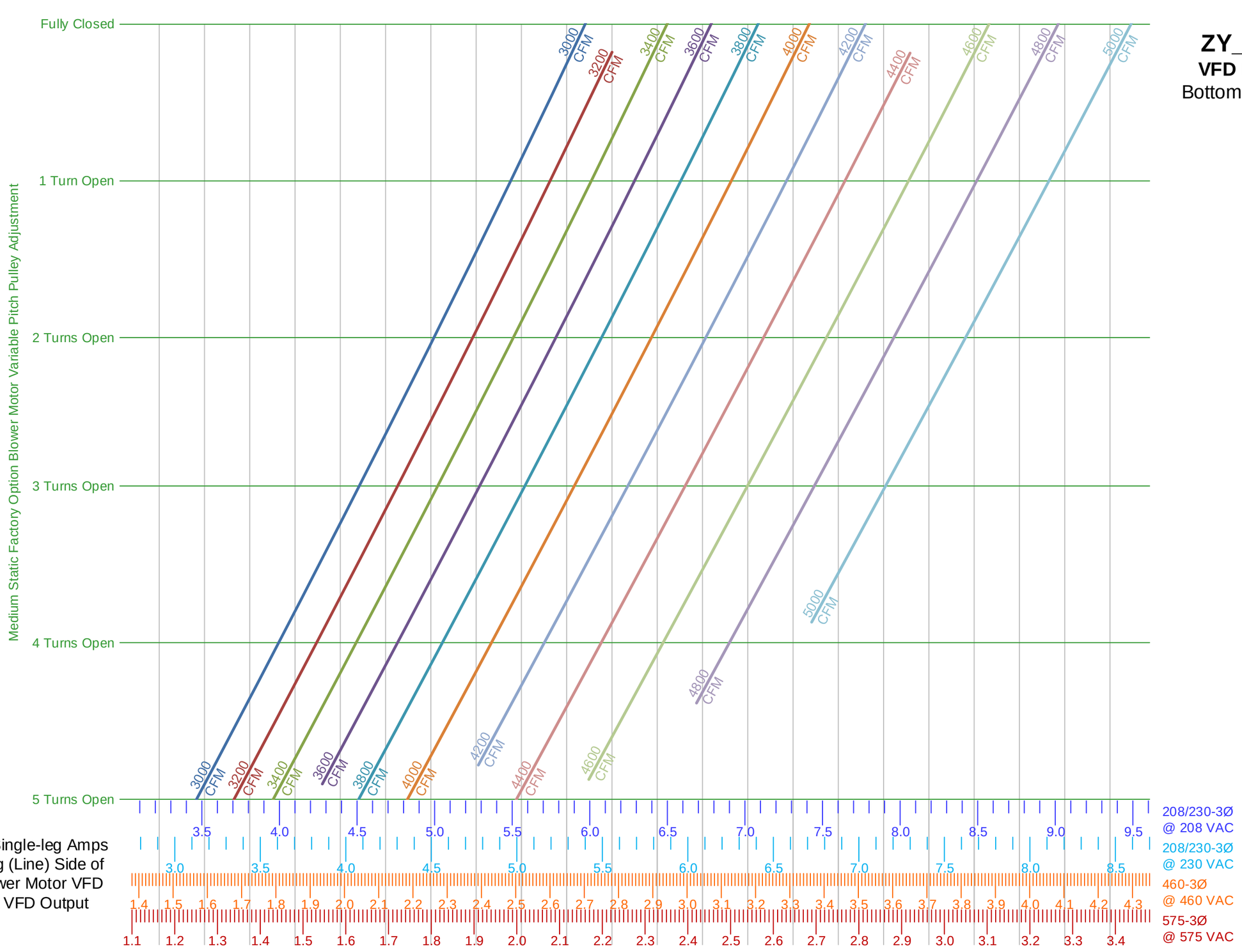
Side Duct Connection



ZY_12 (10 ton)

VFD Medium Static

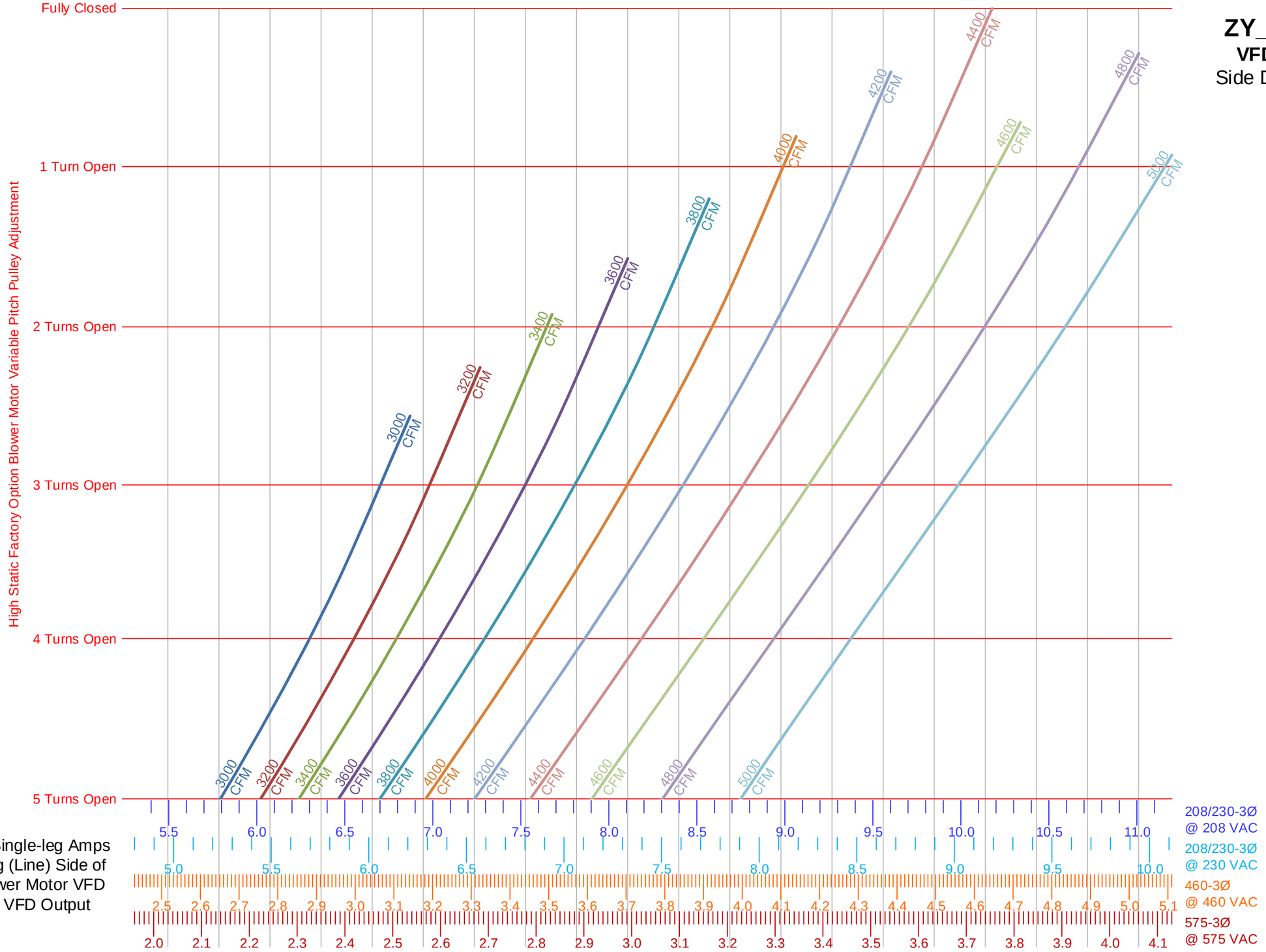
Bottom Duct Connection



ZY_12 (10 ton)

VFD High Static

Side Duct Connection



ZY_12 (10 ton)

VFD High Static

Bottom Duct Connection